Virtues and vices – between ethics and epistemology

Edited volume

Nenad Cekić (Editor)

CONTENTS

Lessons from the past – Virtues and vices from antiquity to modern corporate scandals

Science, fiction, and justice: A study of virtues and vices in today's world

Miljana Milojević

ONE HEALTH, EXTENDED HEALTH, AND COVID‑19[1]

Abstract: The aim of this paper is to critically assess the One Health approach in medical sciences and to contrast it with the alternative Extended Health approach. The mentioned assessment is going to be conducted in line with different methodological and ontological criteria, in order to evaluate whether the One Health approach and which of its variants, can be proven as a fruitful and productive paradigm in medical sciences. After the proposed evaluation, an argument for the reconciliation of the particular kind of non-radical One Health approach with the Extended Health one will be offered. To illustrate the utility of the defended position, an analysis of the case of the COVID-19 pandemic will be given and it will be shown how its management could have been greatly improved by joining these alternative new approaches to medicine.

Keywords: One Health, Extended Health, COVID-19, Anti-Individualism

1. One Health

The general approach to health and disease in the 21st century is starting to seriously take into account various factors external to primary affected organisms in order to identify, treat, and prevent various illnesses. External factors were, of course, trivially always considered when it comes to various diseases, especially those caused by pathogens. Viruses, bacteria, fungi, and parasites, but also chemical and mechanical injuries, constitute the majority of causes of bodily harm and disease and they certainly originate outside of the affected organism. Except for genetic and

*   Department of Philosophy, Faculty of Philosophy, University of Belgrade, mrmiloje@f.bg.ac.rs

immune disorders, diseases are most often caused by environmental and biological factors that are external to the patient. Thus, when we say that the 21st century medical approach started to seriously look into the factors external to the subject of disease we do not mean that medicine is starting to look at the mere external immediate causes of disease. Rather, we are pointing to a certain methodological shift towards a more holistic approach in medical sciences that tries to meaningfully identify and track complex dynamics of the human and animal populations together with their changing environments, and with respect to the emergence of new pathogens, paths of transmission and similar. This holistic paradigm is now known under the name "One Health".

One Health is advocated in some form by all major health organizations today, but its main tenets were recognized a long time ago. The origin of the insight that human and animal health are complexly intertwined with their environment can be tracked to ancient times, and holistic methodology in medical sciences started to be explicitly advocated in the 1800s. It was Rudolf Virchow, a German pathologist, who was inspired by the works of Louis Pasteur and Robert Koch and his own investigations into *Trichinella spiralis*, that found deeper connections between human and animal health and coined the term "zoonosis" to designate an infectious disease passed between humans and animals (Virchow 1859). The discovery of these tight linkages between animal and human health prompted subsequent considerations of the connections between veterinary and human medicine. Nevertheless, it was not before Calvin Schwabe and his 1964 *Veterinary Medicine and Human Health*, that this paradigm of uniting the treatment of human and animal health in a single medical science got its own name and program. Namely, Schwabe coined the term "One Medicine" and called for a unified medicine and a collaborative approach between practitioners of veterinary and human medicine and epidemiology in order to effectively prevent and treat zoonoses.

Although the concept of One Medicine existed in a fairly developed form since the 1960s several decades needed to pass in order to make its main principles recommended as an overall approach for understanding health and, in particular, as providing general framework for controlling infectious diseases. In 2008, One Medicine, now termed "One Health", became a global reality when International Ministerial Conference on Avian and Pandemic Influenza in Sharm el-Sheikh, Egypt was held, after which the One Health strategy was released in a form of a document named "Contributing to One World, One Health™ – A Strategic Framework for

Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface". The document was drafted by the experts of FAO (The Food and Agriculture Organization), WHO (The World Health Organisation), and WOAH (The World Organization for Animal Health) in collaboration with UNICEF, the World Band, and UNSIC (United Nations System Influenza Coordination), and marks an important point in time in which multiple global health agencies pledge to dedicate themselves to a unifying holistic approach in preventing and fighting disease.

We can find the newest definition of "One Health" in the publication of the One Health High-Level Expert Panel (Adisasmito, Almuhairi, Behravesh, Bilivogui, Bukachi, et al. 2022), in which they claim:

> "One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent.
>
> The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate changes and contributing to sustainable development."

A similar determination of One Health can be found on the CDC website, where it is said that:

> "One Health is a collaborative, multisectoral, and transdisciplinary approach — working at the local, regional, national, and global levels — with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment." (CDC website)

On the WHO website, we find a time-relevant remark about the importance of One Health approach for the management of the COVID-19 pandemic:

> "'One Health' is an integrated, unifying approach to balance and optimize the health of people, animals and the environment. It is particularly important to prevent, predict, detect, and respond to global health threats such as the COVID-19 pandemic." (WHO website, https://www.who.int/news-room/questions-and-answers/item/one-health)

Putting forth the One Health approach in the occurrence of a global pandemic is no surprise, especially if we have in mind the plausible zoonotic nature of COVID-19. Given that the discovery of zoonosis was one of the main originators of the One Health approach, most of the efforts of

One Health advocates are aimed at preventing and controlling diseases of zoonotic origin[2]. Nevertheless, special attention to zoonoses of One Health supporters is not only to be found in its past and its origins but also in recognizing the fact that the majority of emerging diseases in the past 50 years were of zoonotic origin. Some of them are HIV (AIDS), Hemorrhagic fever from Hantavirus, Lassa fever, Marburg fever, Lyme disease, Rift Valley fever, Ebola, Nipah disease, West Nile virus, Spongiform bovine encephalopathy, Avian influenza, Zika Gastroenteritis, and Monkeypox. According to the One Health approach, the emergence of new zoonotic diseases in turn asks for a holistic approach in which anything from climate changes, habitat changes, social circumstances and changing ways of living, availability of clean water, etc. has to be taken into account to manage – prevent and control, the emergence of new zoonoses.

2. Philosophy and One Health

Given the rising importance of the One Health approach in medical sciences and health management it is not surprising that a number of philosophical articles appeared that analyze and critically assess this new approach. In this paper, we are going to overview several arguments against radical versions of the One Health approach and try to distill the lessons they teach us. We will also try to make our own distinctions which should hopefully further the discussion.

Sironi et al. (2022) differentiate between two main versions of the One Health approach – the Prudential One Health Approach (POHA) and the Radical One Health Approach (ROHA). The difference between these two approaches is spelled out in terms of their subjects of attention. Namely, POHA is centered on human well-being, while ROHA "considers the overall balance of the living eco-system and the environment from a broader perspective than the human one" (Sironi et al. 2022). Thus, POHA is instrumental to human health, so we are not healing the planet or es-

---

2   Here it is said "zoonotic origin" as many of infectious diseases start as zoonoses which are transmissible inter-species, but afterwards a pathogen mutates and adapts in such a way that it affects only one species after the mutations. Example of such cause of disease is, for instance, HIV. On the other hand, we have "full-fledged" zoonoses such as rabies, West Nile virus, etc. As for COVID-19 as a disease caused by one of the emerging coronaviruses (including SARS and MERS), there is much supporting evidence that it is a case of zoonosis, though some authors demand that COVID-19 should be classified as an "emerging infectious disease (EID) of probable animal origin" (Haider, Rothman-Ostrow et al. 2020).

tablishing a balance between species for its own sake, but to improve the quality of life of our own species and to eradicate or manage illnesses that affect humankind. On the other hand, ROHA can leave humans behind to perish if it turns out that larger ecosystems suffer from our presence. They can both be seen as valid standpoints, but with very different ethical assumptions behind them, and very different practical and epistemological implications in front of them.

If we look at the definitions of the One Health approach, we can easily observe that they do not incorporate the explicit focus on the health of one group or the other, thus they are usually compatible with both POHA and ROHA interpretation of the One Health approach. If One Health is seen as an approach that originated and is still a part of human medicine, then it can easily be read as POHA. On the other hand, by not singling out human species in its manifesto and major definitions One Health can be also interpreted as ROHA. The authors of the paper rightly emphasize the importance of this distinction as it has vast implications on both scientific approaches in health management as well as on policy making. Also, the two versions of the One Health approach have gravely different ethical and epistemological consequences – while the application of POHA would certainly improve human condition, and it would be easier to implement, ROHA requires a radical change in our ethics and faces great epistemological challenges and ethical dilemmas.

If we look at the current practices that are put under the name of One Health, like the management of the COVID-19 health crisis, we will find that they are almost exclusively in line with POHA. Namely, in a holistic treatment of the pandemic we can see that different environmental factors are identified, but they are put into an equation with the distinct anthropocentric perspective. Climate change as an environmental factor is seen as having a causative effect on the changing habitat of some animal species, in this instance bats. Nevertheless, this causative effect, namely the migration of bats, is identified only because the bats were moving closer to human habitats and the growing urbanization is destroying existing buffer zones between the habitats of these two species. Thus, POHA "calls for an important "broadening" of the factors considered without, however, a real change in perspective, method and purpose of knowledge relating to health, such as to configure a radical epistemological shift" (Sironi et al. 2022). On the other hand, ROHA should not focus only on those effects that have a direct bearing on us as a species but should change and broaden the very perspective on how we see health and interconnections between species and their environment. For instance, an extinction of a

species, any species, even human, due to a cyclical event such as climate change can be seen as a natural phenomenon, one which is not to be interfered with.

The difference between POHA and ROHA can also be seen as a difference in an adopted ontology – the ontology of health and relations between species. Namely, adoption of ROHA could be a consequence of adopting a global instead of individualistic ontology of health. It is a question without a clear answer whether we should commit ourselves to a single entity such as the health of a global ecosystem, or we should still focus on individual entities that constitute this ecosystem. The non-existence of the clear answer to this question relies on the normative nature of the notion of "health". Namely, there is an underlying ethical question about what should be healthy, or what should survive – is it a cell, an animal, a species, human race, or an Earth's ecosystem? Also, the interdependence of different organisms and species blurs the boundaries of the proper subject of health, and it is questionable can we even speak of the health of an individual without making a reference to other individuals, including those from other species. Taking the interdependence of human organisms and their microbiota into consideration, for instance, illustrates this point, as it is not clear should we talk about the health of a human or a health of a human+microbiota system.

Thus, evaluation of POHA vs. ROHA can be conducted according to various criteria: ethical, epistemological, methodological, ontological, etc. Nevertheless, in evaluating POHA and ROHA versions of the One Health approach Sironi et. al take a practical stance. The main criterium for deciding between anthropocentric individualistic POHA and non-anthropocentric holistic ROHA is realistic policy and decision making "in an attempt to preserve the planet" (Sironi et. al 2022). Thus, although the more eco-centric view is to be ethically preferred in their opinion, where moral agency is attributed to other species and anthropocentrism is mitigated, POHA and its inter-connectionism that presupposes the individuality of entities seems as a more realistic option. The shift in perspective, which does not have to go all the way to the extreme ends of the ROHA, is welcomed and a number of authors call for the environmental health which is not merely instrumental to the human health (Lysaght et al. 2017). It is pointed out that our efforts must take into account inextricable connections between animals and humans and that One Health has to take an ethical stance which strives to improve the health of humans, animals, and whole ecosystems (Capps and Lederman 2015). It is clear that such an approach prefers practicality and ethics to ontology or metaphysics.

2.1 Assessing the ontological implications of One Health

In their 2018 paper Morar and Skorburg focus on ontological issues surrounding the One Health approach. Sironi et al. (2022) notice that POHA and ROHA would have different ontological implications (we would say conversely that different ontologies can imply different One Health approaches), but do not analyze them in detail. On the other hand, Morar and Skorburg take One Health and similar approaches to be challenging the dominant view that an individual organism is a bearer of health and disease states. We should make a remark here. While Sironi et al. make a difference between POHA and ROHA, by which they undoubtably read at least one version of One Health as endorsing individualistic ontology of health, namely POHA, which advocates the health of human individuals as a function of broader systems; Morar and Skorburg seem to read One Health as adopting anti-individualistic ontology in general when they say that it "proposes a holistic conception of health and disease that extends beyond the traditional individual in order to account for the intricate links between humans, wildlife, and environmental health" (Morar and Skorburg 2018: 351). Thus, Morar and Skorburg's reading of ontological commitments of One Health can be seen as too strong. It can be said that they are more in line with commitments of what was called ROHA, but it is also important to notice that even ROHA was not defined through its ontological commitments but through its priorities and preferences of methodological and ethical kind. In other words, ROHA would follow from adopting global anti-individualistic ontology of health, as we have already noticed, but the converse is not true. Namely, the radicalism of ROHA is in shifting the priority which was on human health to health of other/all species, and not in its radical holistic ontology. Thus, ROHA can still adopt the individualistic ontology just with a shift of interests and ethics to different kind of individuals. Nevertheless, there is, certainly, a space for anti-individualistic ROHA, especially if we take into account all those requests to take care of "the health of the planet", and to introduce balance between species. Thus, we can call this approach OROHA or Ontologically Radical One Health Approach, one which asks for anti-individualistic ontology which transcends the health of individuals.

The ontological issues at hand and OROHA as an approach have to be critically assessed. First, it is clear that One Health as a single approach does not clearly specify its ontological commitments. Second, we can define versions of One Health which have specific ontological commitments, like OROHA that employ extremely extended ontology of health. Third, it is prudent to assume that at least some advocates of One Health implicitly endorse something like OROHA when defending claims about the planet's

health and the overall mutually beneficial connections between species. Thus, even if only some of the One Health variants accept that health can be ascribed to large, weakly connected collectives, then the plausibility of such implications needs to be analyzed.

Morar and Skorburg start from naturalistic assumptions advocated by Boorse (1975, 1997) according to whom statements about diseases are value-neutral, and a matter of natural science. Without challenging the naturalism about health and disease they continue to evaluate the statements and implications about bearers of these states in different approaches to health and medicine. They conclude that in the naturalist camp predominant view is that the relevant individual that bears the medically relevant properties in question is a singular organism.

By briefly examining the assumptions of the opposite side – those of normativist approaches to health and disease – they come to similar conclusions. The normativists unlike naturalists do not focus only on the physiological states, but instead emphasize that for making judgments about health and illness we have to take into account "the ways in which a patient experiences (or not) this condition as something to be avoided, as an illness, along with the social norms that carve out her lived experience" (Morar and Skorburg 2018, cf. Ereshefsky 2009). If certain physiological dysfunctions do not lead to unfavorable subjective, nor social, conditions then it is at least unclear whether such a state should be treated as a disease or an illness. Also, there are the opposite cases where there is no existing physiological dysfunction, meaning all bodily systems are performing their proper functions, but a certain state or behavior is treated as a disease based on social perception and norms (one such case is homosexuality which was treated as a disease until recently, or until the social norms changed). It is an interesting question, but not the one to be dealt in detail here, is how starting from a normative, usually social, identification of an illness, still often asks for a naturalistic explanation of its origin. Thus, seeing homosexualism as an illness, or advocating the inferiority of certain ethnic groups, was almost always followed by series of experiments intending to "prove" such claims empirically by identifying biological defficiencies or malfunctions. So, we can say that even if the normativist approach identifies and defines disease and illness from an externalist social and normative dimension it still seeks explanations on the physiological and biological level. Also, it should be kept clear that we don't see normativism as a platform for advocating racism or bigotry, as it has also clearly helped to see different physiological deficiencies as being "normal", healthy or non-diseased. Nevertheless, it should be noted that normativist views on health are as "good" as our social norms are. As the health terms

usually bear normative connotations in natural language, and we associate need for avoidance, disgust, fear, etc. with "disease", "illness", "sick", etc. we have to be careful in ascribing those attributes.

To get back to the main topic of this article – despite the clear inclusion of external factors, such as social norms, into the individuation process of a disease, illness, or health, normativists still adopt the individualistic organism-centered stance toward the bearers of health and disease states. To corroborate their claims Morar and Skorburg cite Engelhardt (1975) and Goosens (1980) who purport that the appropriate subjects of health and disease ascriptions are individuals whenever such subjects exist.

After surveying the standard individualistic approaches to bearers of health and disease ascriptions, the authors turn to possible anti-individualistic hypotheses. First, they review the importance of the discovery of the symbiotic relationship found in humans and their microbiota, as well as "transactive goal dynamics" framework in psychology advocated by Gráinne Fitzsimmons and colleagues[3], to show cases in which individualistic health models are challenged. After analyzing these potential cases of extended or collective bearers of health and disease ascriptions, Morar and Skorburg turn to the One Health approach as a possible framework for an anti-individualistic treatment of certain health/disease states.

It is safe to say that Morar and Skorburg read the One Health approach in the OROHA way. They sharply contrast the One Health ontology with the individualistic ontology of more conservative approaches. But as we have seen it is only the most radical OROHA, and not POHA, or even ROHA without further specifications, which asks us for a radical ontological revision. For simplicity we can call the latter two approaches "OPOHA" or "Ontologically Prudent One Health Approach", or the One Health approach which adopts individualistic ontology. In context of the debate about the 4E approaches in cognitive science, OROHA can be connected by analogy to the Extended approaches to cognition which see the bodily and environmental factors as constitutive of cognitive processes, while OPOHA, can be connected by analogy to the Embedded approaches which see environmental factors as highly influential on cognitive processes and crucial in understanding their nature and dynamics, but not

---

3   The framework offered by Fitzsimmons et al. is built to deal with mechanisms of "self-regulation" in a novel way. It is well known that a number of health issues directly depend on the ability to self-regulate such as obesity or addiction, but this ability was usually conceptualized as an individual's capability connected to the ability to delay gratification. On the other hand Fitzsimmons et al. investigate how close relationships influence goals and achivement of those goals of the partners and claim that "self-regulatory systems become inextricably linked, part of a complex and messy web of interdependence" (Fitzsimmons et al. 2015).

at the same time as constitutive of them. In that way, OPOHA can also be seen as sympathetic to normative approaches to health and disease in which both physical and sociological environment are seen as necessary for individuating the health/disease states, but on the other hand not as a constitutive of those states. The imbalances in nature, for instance, could be seen as descriptors of diseased states in certain species, but not at the same time as (partial) bearers of those states themselves. OROHA on the other hand asks us to ascribe the relevant health states to ecosystems and potentially to all living beings making them, as a collective, a suitable bearer of health/disease states.

2.2 Problems for OROHA

Morar and Skoburg frame the debate in terms of the narrowness of individualistic approaches to health and the excessive wideness of the One Health approach. Interpreting One Health as OROHA which asks for entities that span biological, sociological and economical domain they argue that such an approach would be far too permissive. They too make a comparison between the OROHA and the Extended Cognition approach and offer argument against the former analogous to the one found in the literature on Extended Cognition (ExCog). Namely, they refer to the arguments for coupling-constitution fallacy and cognitive bloat.

We should briefly get acquainted with what is claimed by ExCog. Clark and Chalmers now famously write in their 1998 paper "The Extended Mind" that:

> "if, as we confront some task, a part of the world, functions as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is (so we claim) part of the cognitive process. Cognitive processes ain't (all) in the head!" (1998: 8)

By claiming this they, in fact, argue in favor of a non-chauvinistic extended ontology of cognitive processes, according to which there are no *a priori* reasons to believe or claim that cognition must take place solely within the boundaries of the skull or in a neural matter of a certain subject. The argument is based on functional assumptions about the mental and the cognitive. If a cognitive process or a mental state is identified by suitable functional roles there are no conceptual or theoretical limitations on the realizers or the location of such states and processes. Thus, at least hypothetically, extended, or partially externally realized cognitive processes and mental states, can exist. Examples of extended mental states could be, for instance, dispositional beliefs stored in a notebook of an Alzhei-

mer patient; and those of extended cognitive processes could be various manipulations of external structures in order to facilitate epistemic tasks, such as the spatial manipulation of shapes in a Tetris game by physical manipulation of appropriate buttons in order to offload the task of mental rotation of shapes onto the console itself.

Adams and Aizawa (2001; 2008) accuse proponents of ExCog of making a "coupling-constitution fallacy". They analyze a number of examples of extended processes found in the literature and claim that advocates of such examples make "a long description of the causal connections between the brain and environment followed by *the move* to the view that these causal loops constitute part of the cognitive process" (2008: 96). And *the move* is constituted by observation of causal dependencies between the environment and the cognizer and the conclusion that they jointly constitute extended cognitive processes when it is only shown that they are only causally connected and not coupled in a way that would constitute a new extended entity (Adams and Aizawa 2008: 91). One such example is found in Wilson (2004):

> "We solve the problem by continually looking back to the board and trying to figure out sequences of moves that will get us closer to our goal, all the time exploiting the structure of the environment through continual interaction with it. We look, we think, we move. But the thinking, the cognitive part of solving the problem, is not squirreled away inside us, wedged between the looking and the moving, but developed and made possible through these interactions with the board." (Wilson 2004: 194; Adams & Aizawa 2008: 93)

Accusations of coupling-constitution fallacy lead to the accusations of producing cognitive bloat. Namely, by postulating constitutional claims based on only causal dependencies advocates of ExCog risk to overextend the constitutional base of cognition rendering the very notion of cognition meaningless. The critics ask what stops us from considering our phones, our laptops, or even the internet as parts of our cognitive systems that at least partially constitute our cognitive processes. It could be said that information retrieved from the internet plays appropriate functional roles in the causal web of my mental states and my behavior, that I regularly rely on web searches in doing my research, and that I am causally connected to the internet through the physical manipulation of my laptop. So, if this is all that is needed for extension then it seems that our minds span over almost all information-bearing artifacts in our environment which seems implausible and detrimental to the research program of cognitive science.

In a similar vein, we could see OROHA as making the same mistake, at least this is what Morar and Skorburg claim.

> "The analogous objection would be this. If we permit constitutive connections among agents and their biological, social, political, economic, and ecological contexts as One Health specifies, where do we draw the line? If everything matters for health, then there is a sense in which nothing really matters." (2018:19)

Also,

> "The analogous concern is that by extending health and disease too far, we will then be forced to admit all sorts of entities into the domain of medical practice that are clearly outside the scope of realistic, effective medical interventions." (Ibid.)

Thus, these authors point out, in a similar fashion to Adams and Aizawa in the case of ExCog, that having overextended cognitive/medical processes or bloated cognitive/medical ontologies would dilute the basic notions of cognitive and medical sciences respectively. Medicine that deals with overextended entities would become clinically inert.

But here we would like to assess some differences between ExCog and OROHA in order to evaluate these arguments against them. First of all, proponents of ExCog do not advocate overextension. Their claims are limited to highly integrated body+artifact systems and they do not wish to claim that their, my, or your mind extends to every book in our respective libraries or similar. Critics then try to show that their arguments for these smaller, tighter systems stretch to the cases of overextension too, so they ask for more criteria – in the case of Adams and Aizawa, they ask for the "mark of the cognitive", or better specification of what makes a thing cognitive in the first place, and what separates these tighter systems from the overextended ones. On the other hand, proponents of OROHA (if they exist, because in the debate about One Health the ontological commitments are not fully spelled out, so there are no authors who explicitly advocate this position although we might say that it is implied by some of the definitions of One Health) would have to start from the claim that overextended systems exist. This would be the foundational claim of OROHA. So in this sense, OROHA proponents do not have to answer the cognitive bloat argument because answering it would mean abandoning their position, but they have to better establish their foundational claims and give us reasons for considering these overextended systems as appropriate bearers of health states. In that manner, the usual response of ExCog proponents against this attack which is spelling out additional conditions of extension such as, for instance, the existence of feedback causal loops between the parts of the system (these conditions should stop the overextension), would not and could not work in case of OROHA proponents, because in that case, they would advocate a completely different approach.

This brings us to the second point, the issue of the practicality of these overextensions and critics' claims that medicine would become clinically inert and meaningless, just like cognitive science will lose its proper subject of investigation. In the case of cognitive overextension, we were starting from individual subjects, and we were trying to find their physical boundaries or boundaries of their minds. It is undoubtedly impractical and meaningless to extend our minds to every possible available information source. Clinical psychology would have no use for it, nor cognitive science which searches for correct cognitive architectures which are responsible for the occurrence of cognitive abilities, and which could be potentially recreated in creating strong AI. But does this apply all the same to OROHA? We think not. Because OROHA is a different program from ExCog. OROHA is not starting from an individual human and her health and then trying to define it in terms of global systems. OROHA if it is at all advocated must be a claim about the health of a global system. Thus, such a program is not a program of human medicine. In that sense, Morar and Skoburg are right that *human* medicine would become clinically inert if it adopts such an ontology, but they miss to notice what Sironi et al. have recognized, and that is that ROHA in general asks for a radical change of perspective and ethics. OROHA medicine would be something completely different from our human medicine, and it also wouldn't be just a sum of botany, ecology, veterinary and medical sciences. It would be a new science of global health.

But is there a viable ontology that could support such a discipline? Perhaps a hypothesis about Gaia (Lovelock 1972, 1979) could be one contender for providing such ontology. According to Gaia hypothesis living beings and inanimate environments like climate systems are co-regulating, and the habitability of the planet, thus life itself, is depending on successful feedback loops that connect all living beings and the inorganic environment. Proponents of Gaia also advocate that there is a single entity, a life itself, that is comprised of all living beings having the same single ancestor. Thus, if the Gaia hypothesis or a similar one can be successfully defended then a medical science of a global entity can be established.

What we learned so far is that the One Health approach needs to be more carefully defined if promoted as a new medical paradigm. Sironi et al. focused on the primary goals of healthcare in this approach and identified POHA and ROHA as two basic forms which differ with respect to the main subject of medical interest – humans or all living species equally. They concluded that ROHA would ask for a too radical change which is not achievable without a complete shift in perspective and ethics. For these reasons, they advocate for anthropocentric POHA and additionally

welcome a slight shift towards planetocentric ROHA. On the other hand, Morar and Skorburg focused on the ontology of health and posited One Health on the extreme end of what we called OROHA. As we saw ROHA itself can keep the individualistic ontology by treating the health of all the species equally but can also take a more radical stance which is in line with the credo "heal the planet" which postulates super-extended entities on a global level to which we can apply medical predicates. Similarly to Sironi et al., Morar and Skorburg argued for the practicality of dispensing with OROHA and its ontology, but this time not because of the feasibility but because of the meaninglessness of medical concepts in this overextended context.

In both camps, we can recognize the call for practicality and understanding the methodologically plausible One Health approach as human oriented. This is not surprising if we recognize that the traditional subject of medical sciences is humankind and it's well-being. One Health in that context is a move for recognizing that human health cannot exist in isolation, but it is intricately connected to the health of other species and the balance of environmental conditions. Thus, it would be prudent to frame the One Health agenda in POHA individualistic terms, where reference to the health of other species, and that of a planet is in the function of human health. That way One Health is staying in a traditional framework of medicine, which is now broadened and takes into account the most diverse external factors. This means that One Health should be seen as closer in methodology and commitments to Embedded approaches to cognition, than to Extended ones. More radical versions of One Health would constitute a different discipline, one which is different from "human" medicine, and which is closer to Earth sciences.

Nevertheless, we can still ask wether the ontology of traditional individualistic medicine is still the proper one even if we reject the OROHA as a contender. This brings us to our last section.

3. Extended Health

In section 2. ExCog was described as an analogous position in cognitive science to One Health in medicine. Towards the end of section 2.2, we have made a remark about the difference between these approaches which is not based on their subject matter, but rather on their starting methodological assumptions. Namely, it was argued that ExCog starts from the traditional subject of cognitive science and then asks about its physical boundaries in order to show that this subject is in fact sometimes

extended, while OROHA starts from the "health of the planet" and thus abandons the traditional subject of medicine and begins with the postulation of a new global entity. We argued that as such OROHA should be better seen as a program of a new discipline different from medicine, and not as a corrective of an old program. Although ExCog is perhaps not the best analogous approach to OROHA, it can still give inspiration for proposing a new ontology for medical sciences.

Morar and Skorburg present Extended Health as an alternative anti-individualistic ontology for medicine apart from OROHA. While the One Health approach brings to focus the question of the complexity of environmental and inter-species relations in understanding health and illness and their management, as we saw previously this approach does not have clear ontological commitments. It recognizes different dependencies between biological subjects and various external factors, but it treats those dependencies equally. Thus, the two options for its ontology are traditional individualism or, as we have seen, an ontologically radical solution which recognizes overextended globally stretched entities or one single global entity which is the true bearer of health states. In other words, those complex dependencies or relations can either be seen as non-constitutive, or they are all constitutive. Extended Health is a middle ground between those two options. It makes a difference between constitutive and non-constitutive relations. The importance of this demarcation can be seen in various examples, some of which are mentioned in this article. For instance, the symbiosis between a human organism and its microbiota is of such a kind that makes it impossible to talk about human health without making a reference to the state of its microbiota. This could be seen as a reason enough to explore a kind of anti-individualistic ontology for medicine, one which is not over extensive and which can have useful implications for clinical practice. The question before us is how to carve nature at its joints and how to separate constitutive from non-constitutive causal connections between the individual organism and entities external to its biological boundaries.

Answers to this question can be sourced in the literature about ExCog, and this is the route that Morar and Skorburg also explore. Milojevic (2020) argues that arguments for ExCog must separately give criteria for the integration and identification of appropriate extended processes or states (for instance, functionalist criteria for extended cognitive processes). Fortunately, the literature on ExCog is bountiful with offers of such criteria, although they are not always called this way. The problem of integration in this literature can be found in analyses of different notions such as: "non-trivial causal spread", "dynamical coupling", "distributed func-

tional decomposition", "continuous reciprocal causation", "glue and trust conditions", etc. (Clark 2008). These notions should facilitate understanding why some interactions lead to creating integrated cognitive systems which can be seen as single entities. One way of explaining integration is by endorsing functionalism and employing the concept of distributed functional decomposition.

> "Distributed functional decomposition is a way of understanding the capacities of supersized mechanisms (ones created by the interactions of biological brains with bodies and aspects of the local environment) in terms of the flow and transformation of energy, information, control, and where applicable, representations. The use of the term functional in distributed functional decomposition is meant to remind us that even in these larger systems, it is the roles played by various elements, and not the specific ways those elements are realized, that do the explanatory work." (Clark 2008: 13–14)

Also, the causal connections between the parts of such systems are explained by concepts borrowed from dynamical systems theory. Thus, the components of these systems will interact in an ongoing, reciprocal way, creating feedback loops, where a change in one part of the system produces change in the other part of the system which in turn affects the first part. Such connections cannot be observed in the overextended "systems" that we mentioned before. Although the information from the internet can and does affect me, that information itself was neither affected by me prior to this effect, nor does it make me affect it later. In the case of a notebook and its user suffering from Alzheimer's disease, the flow of information between the human and the notebook is reciprocal. The information in the notebook is stored by the human, it in turn affects the behavior of its body and perception, which in turn affects the content of the notebook.

The integration of a cognitive system will also depend on a number of dimensions, such as:

> "the kind and intensity of information flow between agent and scaffold, the accessibility of the scaffold, the durability of the coupling between agent and scaffold, the amount of trust a user puts into the information the scaffold provides, the degree of transparency-in-use, the ease with which the information can be interpreted, amount of personalization, and the amount of cognitive transformation." (Heersmink 2017: 433–4)

We can notice that described criteria of integration are tailor-made for cognitive systems. Nevertheless, even if they make reference to notions like "flow of information", "representation", "cognitive transformation", etc. which are higher-level processes and entities found at the cognitive level, they also make use of lower-level processes and events like causal cou-

pling, feedback loop, reciprocal causation, etc. in describing integration. We can expect that we have to find these lower-level criteria satisfied in every kind of extended physical system, including ones that instantiate extended medical states and processes. On the other hand, those systems will have to have additional higher-level criteria satisfied, like joined metabolic processes, exchange of organic and inorganic matter, control of vital processes, etc. If we look at the example of human microbiome, we find the appropriate feedback loops and reciprocal causation. For instance, the microbiota is responsible for synthesizing certain vitamins, like vitamin B, and amino acids, breaking indigestible fibers, polysaccharides, and polyphenols (for which humans lack appropriate enzymes), producing short chain fatty acids, regulating fat deposits, etc. which in turn enable the host's survival, which in turn provide nutrition for microbiota (Rowland et al. 2018). These are only some of the many biological functions that sustain the life and health of a human+microbiota system. Thus, we can say that at least human+microbiota create an extended system to which appropriate medical terms can be applied.

4. Medicine of Extended Health

We saw that different authors conclude that for practical reasons we should prefer less radical and more prudent versions of the One Health approach. This means that the feasible One Health approach will still be focused on humans as their primary subject and it will not include any new ontology, instead, it will keep the traditional individualistic approach according to which the bearers of relevant medical states are individual organisms. As mentioned before that sort of approach is best compared with Embedded approaches to cognition according to which cognitive systems are deeply embedded in their environment and a proper understanding of cognitive abilities and their development calls for investigating and taking into consideration a variety of different external factors. Embedded approaches can be seen as calls for soft revolutions in science, which do not change the subject matter of a specific discipline or its primary methods and postulates, but point out the need to diversify and put its primary subject in a global context. What separates POHA from old-fashioned medicine is then the call for multidisciplinarity and greater collaboration between botany, veterinary sciences, ecology, and human medicine. With this widened interest One Health can certainly help in identifying the sources of certain diseases, mitigating their prevalence, and devising appropriate treatments.

On the other hand, Extended Health calls for a shift in perspective concerning the subjects of medical science. Unlike POHA which looks at usually causally far-removed external factors such as, for instance, the origins of zoonoses, Extended Health focuses on immediate causal factors that have a strong influence on an individual organism. Furthermore, those immediate causal factors create feedback loops with the primary system such that they become parts of thusly created new extended systems. Insisting on including the Extended Health perspective in medical sciences is motivated by the need to put back the subject of health states into the focus of clinical practice. While One Health approaches have the merit of extending the scope of medical research onto environmental factors and, thus, enable a better understanding of the origins, development, and spread of disease, they simultaneously affect medical practices in a way that can be detrimental to primary subjects of health and disease. Namely, by focusing on the disease One Health is losing perspective on the diseased. This can be seen in the management of the COVID-19 pandemic and the employment of specific strategies. In the remainder of the paper, we will briefly analyze a couple of examples that focus on a particular widely used strategy in fighting the COVID-19 pandemic – social distancing, and how it fits with One Health approaches on one side, and how Extended approaches might influence it.

While quarantining is a widely used and effective strategy in fighting infectious disease, by isolating infectious or exposed individuals, one of the main strategies in fighting the COVID-19 pandemic was isolating healthy individuals, or at least non-infectious ones. Isolation and social distancing of individuals was widespread and advocated on a global level by national health institutions and international institutions like WHO. It was carried out by closing public places of interest such as theaters and cinemas, transferring school courses to online platforms, leaving all but essential workers to work from home, employing a 1.5 or 2 m physical distancing rule in public spaces, not allowing seniors to leave their homes for several months, not allowing for larger gatherings at the privacy of a person's home, etc. This strategy was effective in slowing down the spread of the SARS-CoV-2 virus among humans, but it also affected the health of so isolated people in ways that could have been predicted, especially if the Extended Health approach was employed. Namely, we can distinguish at least three kinds of effects of the pandemic on the health of human individuals: 1) direct effect by infection with SARS-CoV-2, 2) indirect effect on mental and physical health induced by fears of infection, fear of our own death or death of close people, anxiety and stress of being infected or spreading the infection, and 3) indirect effect on physical and men-

tal health induced by strategies employed to "fight" the pandemic such as isolation and social distancing. In the past couple of years, researchers have identified a number of physical disorders induced by psychogenic factors such as weight gain (Zachary et al. 2020), and numerous psychological disorders such as depression, anxiety, insomnia, and PTSD. Causes of these disorders can be found also in group 2) of pandemic effects, nevertheless, we are now interested in the effects of strategies for reducing the spread of the coronavirus. This group of effects is identified by (Cenat et al. 2022), which also add fears of losing a job, the anxiety produced by financial insecurities, distress caused by media reports, etc.

Because the One Health approach focuses on the disease itself and its paths of transmission, its interspecies trajectory, and ways to stop its global spread, it is not at the same time too concerned of the effects its strategies have on the individuals. On the other hand, Extended Health does just the opposite. In the concrete case of the isolation of individuals during the COVID-19 pandemic, we can identify several ways in which individuals' health has been hindered. We'll briefly discuss Lyre's shared intentionality (2018), and Kosslyn's (2006) hypothesis of social minds (both examples are discussed in more detail in (Milojevic 2021)).

Lyre (2018) notices that cognitive extension does not have to be only into the body of the cognitive subject or into her physical environment, but it can also happen in a way that extends the original subject onto its "informational", and sometimes onto its social environment. As a case of social extension Lyre analyzes "shared intentionality". It is important to note that Lyre is writing about the strong constitutive kind of cognitive extension even in the cases of social extension, the same kind which Clark and Chalmers defended (1998), and thus he is not defending a claim about shared intentionality in group or collective minds but adopts and modifies the individualistic model of Bratman (1993). According to this model, an individual can have her own intention which is partially constituted of intentions and plans of another individual, though that primary intention cannot be ascribed to them together or jointly, nor to that other individual. In such a case, the nervous system of a second individual is becoming a constitutive part of the first's individual cognitive system. Such coupling can occur when both individuals intend to jointly accomplish a given action in a cooperative way, and in the process both become extended on the neural resources of another.

On the other hand, Kosslyn (2006) talks about social prosthetics and uses arguments independent from Clark and Chalmers (1998). Kosslyn sees social extensions of human cognitive systems as a natural consequence of their limited neural resources. Humans evolve in highly structured en-

vironments which reciprocally influence cognitive processes which are primarily realized in a neurally plastic flexible brain. According to Kosslyn the structure of our brains is not fully determined by our genes, but it is also strongly influenced by the environment. Thus, because of limited neural resources humans build a great number of tools that can be seen as cognitive prosthetics. Some of these tools are language, different kinds of notations, and some classical tools for navigation like compasses, etc. Nevertheless, Kosslyn's main point is that we do not build only artifacts to extend our resources, nor do we only structure our physical environment, but we also deeply rely on other people in performing cognitive and emotional tasks to the point that our personal identity depends on the people from our immediate surroundings. Others help us make decisions, form intentions, judge options, etc. Cases in which humans borrow parts of their cognitive resources from another human being in a transient or more permanent arrangement Kosslyn calls Social Prosthetic Systems.

Taking into account these hypotheses about a cognitive extension by social connections we can easily draw implications of social isolation of individuals in the period of COVID-19 pandemic. Despite the frequent claims that strategies for fighting COVID-19 pandemics were not employing social, but physical distancing and isolation, we claim that many social interactions have a physical component and that keeping virtual communication while removing the physical connections between people is sufficient for breaking many different social bonds. Cooperative endeavors frequently assume shared physical space and environment which allows for joint manipulation of task space. In that sense introducing physical distancing directly affects our methods of problem-solving, and with acceptance of Socially Extended Cognition our cognitive processing, and even our personal identity if we accept Kosslyn's claim about Social Prosthetic Systems. Thus, strategies of isolation can be seen as influencing the mental health of individuals not only by introducing negative external factors but also by influencing the integrity of the subjects themselves.

5. Concluding remarks

In this paper, we analyzed different methodological and ontological commitments of the One Health approach and we have concluded that they are not yet fully transparent in the offered formulations of this view. Nevertheless, we can differentiate between different versions of the One Health approach by explicitly employing the distinction between POHA and ROHA as two methodologically different approaches with two dif-

ferent aims, and OROHA and OPOHA as two ontologically different approaches that employ either radical anti-individualistic ontology or prudential traditional individualistic ontology of medical sciences. We have judged that OROHA is ontologically opposed to both traditional medical approaches and to Extended Health approach. Morar and Skorburg argued that Extended Health should be seen as an alternative anti-individualistic approach to the One Health one, but with more careful implementation of the introduced distinctions it is clear that this is true only for its radical ontological version. We have also argued that such a radical alternative would ask for the constitution of a different scientific and health discipline distinct from human medicine. Instead, we argued for cooperation between the prudential approaches of One Health which have practical, methodological, and ontological advantages, and Extended Health approaches. This amalgam of approaches should improve current practices on two fronts simultaneously: a) expanding the field of study and introducing multidisciplinarity which is needed for understanding the origins, spread and development of diseases that cross species barriers or occur because of environmental imbalances, and b) keeping the focus on an individual and her health by carefully examining the boundaries of systems to which we should apply health properties. The case of strategies employed to fight the COVID-19 pandemic showed that not introducing both approaches at the same time can lead to detrimental practices which safeguard the health of individuals on one front but negatively influence it on the other.

References

Adams, F. R., & Aizawa, K. (2001). "The bounds of cognition". *Philosophical Psychology* 14 (1), 43–64.

Adams, F. R., & Aizawa, K. (2008). *The Bounds of Cognition*. Oxford: Wiley-Blackwell.

Boorse, C. (1975). "On the distinction between disease and illness", *Philosophy & Public Affairs* 5(1):49– 68.

Boorse, C. (1997). "Rebuttal on Health". In J.M. Humber et al. (eds.) *What is Disease?*, 1–134. New York: Springer.

Bratman, M. (1993). „Shared intention". *Ethics* 104 (1):97–113.

Capps, B., Lederman, Z. (2015). "One health, vaccines and ebola: the opportunities for shared benefits". *Journal of Agricultural and Environmental Ethics* 28(6):1011–32.

CDC (2022). "One Health Basics". https://www.cdc.gov/onehealth/basics/index.html

Cénat, J. M., Blais-Rochette, C., Kokou-Kpolou, C. K., Noorishad, P.-G., Mukunzi, J. N., McIntee, S.-E., Dalexis, R. D., Goulet, M.-A., Labelle, P. R. (2021). „Prevalence of symptoms of depression, anxiety, insomnia, posttraumatic

stress disorder, and psychological distress among populations affected by the COVID-19 pandemic: A systematic review and meta-analysis". *Psychiatry Research* 295

Clark, A. & Chalmers, D. (1998). "The Extended Mind". *Analysis* 58(1):7–19

Clark, A. (2008). *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*. Oxford: Oxford University Press.

Engelhardt Jr, H.T. (1976). "Ideology and etiology". *The Journal of Medicine and Philosophy* 1(3):256–268.

Ereshefsky, M. (2009). "Defining 'health' and 'disease'". *Studies in History and Philosophy of Biological and Biomedical Sciences* 40:221–227.

FAO et al. (2008). "Contributing to One World, One Health™ – A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface". https://web.archive.org/web/20150606122557/http://www.oie.int/doc/ged/D5720.PDF

Fitzsimons, G. M., Finkel, E. J., & van Dellen, M. R. (2015). "Transactive goal dynamics". *Psychological Review* 122(4):648–673.

Goosens, W. (1980). "Values, Health and Medicine". *Philosophy of Science* 47: 100–115.

Haider, N., Rothman-Ostrow, P., Osman, A.Y., Arruda, L.B., Macfarlane-Berry, L., Elton, L., Thomason, M.J., Yeboah-Manu, D., Ansumana, R., Kapata, N., Mboera, L., Rushton, J., McHugh, T.D., Heymann, D.L., Zumla, A. and Kock R.A. (2020). "COVID-19—Zoonosis or Emerging Infectious Disease?". *Front. Public Health* 8:596944. doi: 10.3389/fpubh.2020.596944

Heersmink, R. (2017). "Distributed cognition and distributed morality: Agency, artifacts and systems". *Science and Engineering Ethics* 23 (2): 431–448.

Kosslyn, S. M. (2006). "On the Evolution of Human Motivation: The Role of Social Prosthetic Systems". In S. M. Platek, T. K. Shackelford & J. P. Keenan (Eds.), *Evolutionary cognitive neuroscience* (Cambridge, MA: MIT Press): 541–554

Lovelock, J. (1972). "Gaia as seen through the atmosphere". *Atmospheric Environment* 6 (8): 579–580. doi:10.1016/0004–6981(72)90076–5.

Lovelock, J. (1979). *Gaia:a new look at life on earth*. Oxford UP.

Lyre, H. (2018). „Socially Extended Cognition and Shared Intentionality". *Frontiers in Psychology* 9.

Lysaght, T., Capps, B., Bailey, M., Bickford, D., Coker, R., Lederman, Z., et al. (2017). "Justice is the missing link in one health: results of a mixed methods study in an urban city state". *PLoS One* 12(1):e0170967.

Milojevic, M. (2020). "Extended mind, functionalism and personal identity". *Synthese* 197: 2143–2170. https://doi.org/10.1007/s11229–018–1797–5

Milojević, M. (2021). "Socially extended cognition and covid-19 pandemic". In Nenad Cekić (ed.), *Етика и истина у доба кризе*. Belgrade: University of Belgrade – Faculty of Philosophy. pp. 235–253.

Morar, N., Skorburg, J.A. (2018). "Bioethics and the Hypothesis of Extended Health". *Kennedy Inst Ethics J.* 28(3):341–376. doi: 10.1353/ken.2018.0020. PMID: 30369509.

One Health High-Level Expert Panel (OHHLEP), Adisasmito WB, Almuhairi S, Behravesh CB, Bilivogui P, Bukachi SA, et al. (2022). "One Health: A new definition for a sustainable and healthy future". *PLoS Pathog* 18(6): e1010537. https://doi.org/10.1371/journal.ppat.1010537

Rowland, I., Gibson, G., Heinken, A., Scott, K., Swann, J., Thiele, I., Tuohy, K. (2018). "Gut microbiota functions: metabolism of nutrients and other food components". *Eur J Nutr*. 57(1):1–24. doi: 10.1007/s00394–017–1445–8.

Schwabe, C.W. (1964). *Veterinary Medicine and Human Health.* Williams & Wilkins

Sironi, V.A., Inglese, S. & Lavazza, A. (2022). "The "One Health" approach in the face of Covid-19: how radical should it be?". *Philos Ethics Humanit Med* 17, 3. https://doi.org/10.1186/s13010–022–00116–2

Virchow, R. L. K. (1859/1978). *Cellular pathology*. London: John Churchill

WHO (2022). "One Health". https://www.who.int/news-room/questions-and-answers/item/one-health

Wilson, R. A. (2004). *Boundaries of the Mind: The Individual in the Fragile Sciences: Cognition*. New York: Cambridge University Press.

Zachary, Z., Brianna, F., Brianna, L., Garrett, P., Jade, W., Alyssa, D., & Mikayla, K. (2020). „Self-quarantine and weight gain related risk factors during the COVID-19 pandemic". *Obesity research & clinical practice* 14(3): 210–216.