PHILOSOPHICAL EXPLORATION OF PANDEMIC EPISTEMOLOGY

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Abstrak

Pandemi Covid-19 telah mengubah perilaku masyarakat dalam beragam aspek kehidupan secara signifikan. Sebagai sebuah diskursus kontemporer, pandemi perlu dipahami dengan suatu pendekatan yang lebih komprehensif. Artikel ini menyajikan dua pandangan umum tentang pandemi; yaitu perspektif naturalistik, yang melihat pandemi sebagai entitas individual mikroskopik maupun sebagai suatu proses kehidupan; dan secara sosio-konstruktivis, yang melihat pandemi sebagai bencana non-alamiah dan konsensus wacana publik. Pandangan kedua lebih mendapatkan perhatian publik, karena adanya kedekatan pengalaman sosiologis di tengah kondisi ketidakpastian informasi, akibat dari maraknya disinformasi, berita bohong, kerentanan pengetahuan dan adanya ruang kebebasan digital-virtual masyarakat. Meskipun tidak pula dapat disangkal, adanya kesimpangsiuran informasi atau kepentingan politis tertentu dari otoritas pemerintahan ataupun komunitas ilmiah. Dimensi post-truth juga turut memengaruhi konstelasi sosio-epistemik masyarakat dalam memahami pandemi. Di sinilah kontribusi dari artikel ini, yaitu membuka ruang diskusi ilmiah-filosofis yang diharapkan mampu menghasilkan kerangka epistemologis untuk memahami pandemi berdasarkan tinjauan epistemologi yang lebih ketat, sehingga dapat menjadi pertimbangan kebijakan pasca pandemi.

Abstract

The Covid-19 pandemic has significantly shifted people's behavior in various aspects of life. As a contemporary discourse, pandemic needs to be understood with a more comprehensive approach. This article contains two common perspectives on pandemics: naturalistic perspective, which views pandemics either as individual microscopic entities or as a life process; and socio-constructivist, which views pandemics as non-natural disasters and public discourse consensus. The second view is getting more public attention because of its closeness to sociological experiences amid information uncertainty, which formed from the prevalence of disinformation, fake news, knowledge vulnerabilities, and society's digital-virtual freedom. However, there is also undeniable confusion about information or particular political interests from government authorities or the scientific community. The post-truth dimension also influences the socio-epistemic constellation of society in understanding the pandemic. This article aims to open a scientific-philosophical discussion and produce an epistemological framework for understanding the pandemic based on a more rigorous epistemological review and then can be a post-pandemic policy consideration.

Introduction

The history of human civilization has recorded various pandemics that have become non-natural disasters as a form of a health crisis. Unpreparedness for a completely different reality has been a challenge in the history of humanity. Changes in the orientation of views on the existence of non-humans are growing. These supposedly visible entities were studied for centuries, later known as viruses and bacteria.[1] A series of very deadly pandemic events experienced throughout human history during the Middle Ages was the black death or bubonic plague. In addition, the Spanish flu also influenced changes in the social order of society during the First World War, which also triggered a shift in the world economic cycle. Other viral variants such as Avian Influenza, Swine Flu, MERS, Zika, SARS, and the novel coronavirus (SARS-CoV-2) have also co-existed over the past half-century. They have transformed a

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[1] Richard Howey and Margo Chase-Topping Mark Woolhouse, Fiona Scott, Zoe Hudson, "Human Viruses: Discovery and Emergence," *Philosophical Transactions of the Royal Society B: Biological Sciences* 367, no. 1604 (2012): 2864–2871, https://royalsocietypublishing.org/doi/10.1098/rstb.2011.0354.

complex range of public health policies.[2]

There are two ontological views that viruses naturally arise due to the significant influence of human activities. This second opinion is usually more robust because it aligns with contemporary ideas related to the Anthropocene geological time scale (The Anthropocene epoch), which places the rate of anthropogenic activity as the main point of change in global geological structure. After the events of The Great Acceleration in the 1950s, the acceleration of global socio-economic trends and changes in the earth's system is increasingly manifesting, one of which is caused by the high mobility-globalization of humans.[3] The global human transition has led to more social and natural spaces. This openness is the primary reason why today's society is vulnerable to local outbreaks or global pandemics. Zoonotic transmission from human to human is increasingly challenging to control in the era of global openness of space and boundaries. This also applies to the Covid-19 pandemic, which has caused changes in the behavior of the world community towards the new normal since the beginning of 2020.

The effect of the Covid-19 pandemic on people's lives has reached the point of cultural and structural transformation on a micro and macro scale. Uncertainty and the threat of natural death caused instant societal changes, which indirectly led to *panic buying*[4] at the beginning of the pandemic and culture shock. The impetus for accelerating changes to the new normal that is not accompanied by increased facilities and convinced protection makes people experience a phase of mental unpreparedness, resulting in pandemic fatigue.

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[2] Poppy S. Winanti and Wawan Mas'udi, *New Normal: Perubahan Sosial Ekonomi dan Politik Akibat Covid-19* (Yogyakarta: UGM Press, 2020).

[3] Anu Valtonen and Outi Rantala Pasi Heikkurinen, Toni Ruuska, "Time and Mobility after the Anthropocene," *MDPI: Sustainability* 12, no. 12 (2020): 5159, https://www.mdpi.com/2071-1050/12/12/5159.

[4] Russell Kabir S.M. Yasir Arafat, Sujita Kumar Kar, Marthoenis Marthoenis, Pawan Sharma, Ehsanul Hoque Apu, "Psychological Underpinning of Panic Buying During Pandemic (COVID-19)," *Psychiatry Research* 289, no. (2020): 113061, https://www.sciencedirect.com/science/article/pii/S0165178120310039?via%3 Dihub.

Social media as a means for society to escape from a pandemic has positive and negative impacts. However, the pandemic gave rise to a new epistemic distraction with the uncertainty of information scattered in the digital world. The speed of access to information affects the public's perception of the status of the pandemic. Government policies always bring up pros and cons in the community. It is again supported by the uncertainty of information which causes ambiguity. This knowledge channels a data war that causes conspiracies, fake science, and hoaxes; that is, the lack of clarity of information which can affect the epistemic view of pandemic data (*infodemic*), the level of trust in any public health policy, the existence of the virus, and vaccination strategies.

This study formulates an initial framework regarding pandemic epistemology. Several previous studies only concerned at the role of philosophy in the pandemic era, for example, Velázquez (2020)[5] *'The role of philosophy in the pandemic era'* which explains the fragility and impotence of humans, the limitations of techno-science, the status of human solidarity, and the value of death. Likewise, Randall and Rafferty discuss the same issue with different point of view, public policy and a fair moral review in the face of the Covid-19 pandemic.[6]

Based on the author's investigations, there are only two philosophical studies regarding the epistemological issue of pandemics in Indonesia. First, Choirunnisa's study entitled '*Coronavirus disease 2019 (Covid-19) in the Philosophy of Science perspective.*'[7] The study does not explain the status of Covid from the standpoint of science, especially in epistemology in detail. Choirunnisa only explains the flow of general

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[5] Lourdes Velázquez, "The Role of Philosophy in the Pandemic Era," *Bioethics Update* 6, no. 2 (2020): 92–100, https://www.bioethicsupdate.com/previous/BIOUP_Vol_6 (2020)/BIOUP2020_v6_n2_092-100.pdf.

[6] Rachel M Randall and Rachel Rafferty, "Philosophy Problems Become Real During the COVID-19 Pandemic," *JBJS* 102, no. 15 (2020): e88, https://journals.lww.com/jbjsjournal/Fulltext/2020/08050/Philosophy_Problems_Become_Real_During_the.4.aspx.

[7] Sulistya Choirunnisa, "Coronavirus Disease 2019 (Covid–19) dalam Perspektif Filsafat Ilmu," *JUSTITIA: Jurnal Ilmu Hukum dan Humaniora* 7, no. 3 (2020): 536–546, http://jurnal.um-tapsel.ac.id/index.php/Justitia/article/view/1553.

knowledge of the Covid-19 pandemic and solidarity efforts to solve pandemic problems. Secondly, Kerwanto's study entitled '*Covid-19 in terms of the Epistemology of Sufi Tafsir: An Application of Referential Interpretation (Tafsir Misdaqi) on Quranic Verses*' which merely discusses the thematic interpretation of the Qur'an based on Sufi Epistemology.[8] Meanwhile, this study is directed to explain the epistemology of pandemics with a Western Philosophy orientation framework in a systematic and comprehensive manner. It involves openness to criticism and comparison of epistemological and pandemic discourses.

Apart from the above controversy, the author sees that it is appropriate to formulate a philosophical view of the pandemic. Nevertheless, the philosophical view of pandemics needs to be specified in-depth as a particular branch of philosophy, one of which is epistemology. The urgency of exploring the epistemology of pandemics is to find out the concept of belief, truth, and justification for pandemic knowledge. Moreover, it should not stop at the concept of argumentation and the structure of the problem dealing with skepticism, the sources, and the scope of justification for pandemic knowledge. Thus, this study can practically contribute to the transition phase to a new normal through the framework of an initial review of pandemic epistemology that is sourced from the social construction of society, scientific findings, and epistemological politics.

As a philosophical investigation, this study was conducted with deep reflection through the data interpretation process using qualitative methods and literature study. Several relevant studies or research reports were then understood as approaches and philosophical foundations when formulating hypotheses, collecting data, comparing data, and analyzing data comprehensively.

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[8] Kerwanto, "Covid-19 Ditinjau dari Epistemologi Tafsir Sufi: Sebuah Penerapan Tafsir Referensial pada Ayat-Ayat," *Jurnal Bimas Islam* 13, no. 2 (2020): 371–402, https://jurnalbimasislam.kemenag.go.id/index.php/jbi/article/view/213.
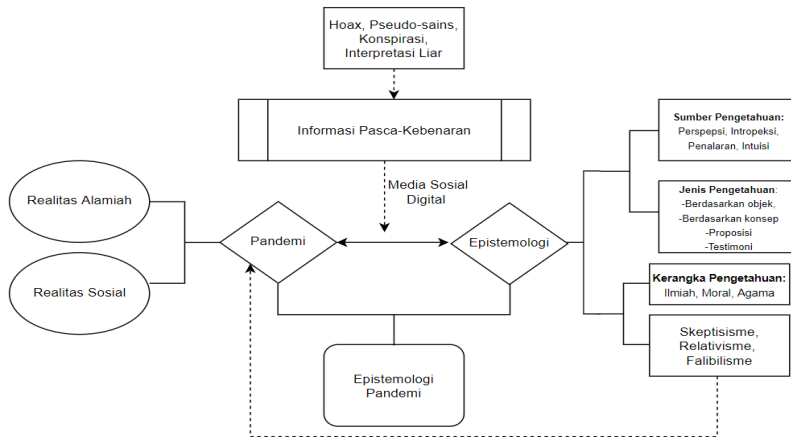
Figure (1). Theoretical Framework
(Source: Author data processing)

As shown in Figure 1, the study of pandemic epistemology has seen its reality naturally and socially, both of which have different meanings, such as the debate between constructivism and naturalism. In addition, this study is placed on a general definition of epistemology based on sources, types, frameworks, and limits of knowledge. This broad definition does not make it easier to trace relevant sources throughout the general epistemological discourse. The chart (*skepticism, relativism, and fallibilism*) vaguely connected to pandemics gives a brief overview that these three epistemic attitudes can also influence the definition of a pandemic.

In addition, the influence of post-truth information during the pandemic phase also plays an active role in immensely shaping public knowledge. The speed of transition, dissemination, and penetration of information in social media have also resulted in misinformation, conspiracy, and pandemic pseudoscience. Thus, this study framework becomes a blueprint for the boundaries and explorations of pandemic epistemology investigation. Therefore, this article answers two main research questions; what is pandemic epistemology? and what are the practical implications of pandemic epistemology in public policy?

General Epistemology

Epistemology is one of the main branches of philosophy except Metaphysics and Axiology. According to Pritchard, the initial approach to epistemology starts with the JTB (*Justified True Belief*) issue,[9] knowledge structure, source of knowledge debate, subjectivity-objectivity, and skepticism. On the other hand, Honderich provides a comprehensive map of epistemology. Epistemology is divided based on the sources, the types, the frameworks, and the critiques of knowledge. The sources of knowledge are divided into perception, introspection, reasoning, and intuition.[10] Types of knowledge are divided based on the object concept, both in propositions and testimonies. Honderich explains that knowledge can be based on a scientific, moral, or religious framework. At the same time, the criticism of knowledge starts from skepticism, relativism, and fallibilism.[11] Historically, the development of epistemological discourse is divided into at least three historical stages; classical, modern, and contemporary epistemology.[12] Each of these developmental stages is characterized by a different epistemological approach. In the context of contemporary epistemology, the epistemological approach does not stop at only understanding what knowledge is, but also epistemology of development towards metaepistemology starting from issues of naturalism, feminism, social construction, pragmatism, and even intuition.

Problems in metaepistemology are related to the review of theoretical decisions in epistemology, especially in higher-order.[13] For example, when looking at the issue of epistemology in the normative dimension, it can be viewed in questions about the normative status of beliefs such as "What should we believe? What are the reasons for

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[9] Duncan Pritchard, *What Is This Thing Called Knowledge?* (Roudletge, 2018).

[10] Ted Honderich, *The Oxford Companion to Philosophy* (OUP Oxford, 2005).

[11] Ted Honderich, *The Oxford Companion to Philosophy*.

[12] Jan Woleński, "The History of Epistemology," in *Handbook of Epistemology* (Springer, 2004), 3–54.

[13] Conor McHugh, Jonathan Way, and Daniel Whiting, *Metaepistemology* (Oxford University Press, 2018).

believing certain things compared to other things?" However, issues related to normativity trigger various problems, "What is the basis of the normativity of knowledge or belief? Is there a fact that becomes a reference for the normativity of knowledge, belief, or an action?" Thus, meta-epistemology does not confine contemporary discourse to what has been encountered and has become an established school of epistemology.

Furthermore, the approach to social epistemology becomes interesting because it questions fundamental epistemology. Social epistemology embeds the social dimension in the epistemological approach. The need for a social approach in epistemology is motivated by the tendency to acquire knowledge and form beliefs centered on individual agents compared to acquiring knowledge and forming beliefs that also involve social aspects. When compared with the classical epistemological approach, social epistemology is considered part of epistemic relativism, such as the position advocated by Boghossian,[14] MacFarlane,[15] and Rorty.[16] However, understanding the post-truth status requires a metaepistemological approach. Post-truth is one of the most interesting recent epistemological discourses to be studied further.

Before entering post-truth discourse, it is necessary to describe the realistic ideas that often become the reference in all epistemic activities carried out by humans. According to Lynch, true belief is the final achievement of the human searching process, or in other words, it is the final epistemic achievement.[17] Epistemic activities carried out by humans are constitutive, producing true beliefs. On the other hand, epistemic realism faces various challenges from anti-realist epistemologies, as

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[14] Paul Boghossian, "Epistemic Relativism Defended," *Social Epistemology: Essential Readings* (2011): 38.

[15] John MacFarlane, *Assessment Sensitivity: Relative Truth and Its Applications* (OUP Oxford, 2014).

[16] Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton university press, 1979).

[17] Michael P Lynch, "Truth, Value, and Epistemic Expressivism," *Philosophy and Phenomenological Research* 79, no. 1 (2009): 76–79, https://onlinelibrary.wiley.com/doi/10.1111/j.1933-1592.2009.00267.x.

advocated by Chrisman,[18] Kappel,[19] and Kyriacou.[20] This challenge is motivated by epistemic realism, which is covered by ontological and epistemological issues, such as the existence of facts on truth, the basis of belief authority. In contrast, anti-realist truth depends on the subject's desires, goals, intentions, plans, and other factors. The most dangerous thing is that there is no limit to what we should believe, or even worse, we will fall into radical skepticism for which there is no objective truth.

Post-Truth Epistemology

The idea of anti-realism epistemology emerged in the post-truth era when the truth was no longer the basis for the process of acquiring knowledge or forming beliefs. Post-truth is a critical review of epistemology and its relationship to public trust in certain ontological statuses. Historically, post-truth discourses and studies began to develop rapidly in the study of epistemology and philosophy of science after the political agenda of Brexit and the United States presidential election between Hillary and Trump. Post-truth epistemology can be understood through the critical elaboration of the position of truth in post-truth itself. If classical epistemology draws on the issue of justified-true-belief, it is precisely this post-truth position that can lead to justified-false-believe. In general, post-truth concerns various derivatives that are often found in everyday life, both in the real and digital media world including conspiracies, hoaxes, misinformation, and pseudo-science.

Unlike the two previously described views, constitutivism seeks to base the normativity of constitutive facts on the agency. These facts are

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[18] Matthew Chrisman, "From Epistemic Contextualism to Epistemic Expressivism," *Philosophical Studies* 135, no. 2 (2007): 225–254, https://www.jstor.org/stable/40208748.

[19] Klemens Kappel, "Expressivism about Knowledge and the Value of Knowledge," *Acta Analytica* 25, no. 2 (2010): 175–194, https://link.springer.com/article/10.1007/s12136-009-0073-1.

[20] Christos Kyriacou, "Habits-Expressivism about Epistemic Justification," *Philosophical Papers* 41, no. 2 (2012): 209–237, https://www.tandfonline.com/doi/abs/10.1080/05568641.2012.699173?journalCode=rppa20.

naturally understood as mind-dependent facts. The position advocated by Korsgaard states that the epistemic fact that forms the basis of this normativity depends on the mind, which is assumed to be a necessary constitutive precondition of the agent.[21] That is, an agent is necessarily committed to the agency's constitutive preconditions and cannot think otherwise. Belief for constructivists is mentally used to search for truth and gain knowledge. Trust is a normative state that aims to get to the truth; therefore, truth must be used as a means to regulate beliefs.[22]

The development of contemporary epistemology then investigates how knowledge is possible, analyzes the sources of knowledge philosophically, and opens a thematic space regarding the epistemic relationship between the world that has been integrated with technology, communication, and information. The diversity of information spread digitally results in unclear information and knowledge that exists and is trusted by the public or social media users. On the other hand, post-truth also opens the opportunity for an imbalance situation between expert and random opinions from certain groups Thus, it provides the possibility of conspiratorial interpretation of reality false science due to an emotional motivation that is stronger than rational considerations.

According to Blackburn, post-truth epistemology has a strong foundation with the influence of postmodernism's version of the truth and relates with socio-political epistemic.[23] In the post-truth case, the fact no longer indicates the objectivity of the truth itself. Still, it leads to preferences, persuasions, and emotions which are understood collectively.

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[21] Christine M Korsgaard et al., *The Sources of Normativity* (Cambridge University Press, 1996).

[22] Alvin I Goldman, "A Guide to Social Epistemology," in *Social Epistemology: Essential Readings*, ed. Alvin I. Goldman and Dennis Whitcomb (New York: Oxford University Press, 2011), 11–37, https://www.pul.it/cattedra/upload_files/15768/Goldman&Whitcomb_-Social Epistemology Essential Readings 2011.pdf.

[23] Simon Blackburn, "Politics, Truth, Post-Truth, and Postmodernism," in *The Routledge Handbook of Political Epistemology*, ed. Michael Hannon and Jeroen de Ridder (London & New York: Rouledge, Taylor & Francis Group, 2021), 65–73, https://ebin.pub/the-routledge-handbook-of-political-epistemology-2020047803-2020047804-9780367345907-9780429326769-9780367754686.html.

Bernecker et al. assert that the definition of post-truth leads to a condition when public opinion is dominated by feelings and personal beliefs rather than objective facts.[24] Post-truth is systematically shaped by irrelevant truth factors and are believed to be the public opinion truth. There are two main factors that post-truth can be realized, namely the existence of irrational public opinion and agents of misinformation. However, environmental factors or agents who manipulate evidence can lead to views in the form of fake news. Post-truth can be traced from several phenomena ranging from information cascades (groups that hide relevant information), filter bubbles (internet algorithms that direct users to specific information), journalistic practices (the existence of an ambiguous narrative tendency for the public), social media (media dissemination of information and distribution of fake news), as well as certain ideologies.

Post-truth epistemology in this context specifically refers to the phenomena of fake news and conspiracies that have developed since the spread of the global Covid-19 pandemic. This is because a more robust epistemological basis for testimony emerged and became the focus of discussion on the epistemological theme of the pandemic. Attention to the epistemology of testimony is strong enough to explain the relationship between epistemic status (justification and knowledge) and beliefs formed by someone through other people's words before (testimonials). The testimony raises two main views: reductionism and anti-reductionism.[25] Anti-reductionists argue that truth-telling is common in society; particular testimonies can be considered valid unless there is reason to question them. While reductionists assert that general testimony cannot or is difficult to believe in its entirety, each recipient of testimony/testimonials must double-check the source of belief before accepting it. Nonetheless, both views have challenges in the digital age with anonymous content

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[24] Sven Bernecker, Amy K Flowerree, and Thomas Grundmann, *The Epistemology of Fake News* (Oxford University Press, 2021).

[25] Sven Bernecker, Amy K Flowerree, and Thomas Grundmann, *The Epistemology of Fake News*.

sources. The recipient of the truth cannot confirm who the testifier is. If it is random or unknown, it could be a real person or an *AI/chatbot*, especially in the source of truth, evidence, honesty, and competence.

Post-truth can come from ordinary users of social media, mass media, and certain groups that have the characteristics of group polarization, extreme identity, and excessive anxiety about news or truth spread in cyberspace. According to Jaster and Lanius, there are seven dimensions of fake news in the post-truth context, including the *truth dimension* in which the news is fake, false and misleading; *dimensions of deception* in which the news distribution intends to deceive; the *bullshit dimension* in which the contributors are indifferent to the truth; *dimensions of appearance* or *imitation* of 'real' news; *dimensions of impact* (effect), being the center of attention, because it deceives the audiences; *dimensions of virality* or to be widely disseminated; and *dimensions of media*, phenomena that occur on the internet and social media.[26] Thus, post-truth epistemology has the issue of testimonials and truth verification tests where a news report or information that does not have any truth has been disseminated to deceive or ignore the truth.

Various Views of Pandemic Epistemology

The term pandemic is often associated with categorizing the distribution of a case of a disease spreading based on its geographical extent. The general definition of a pandemic is an epidemic that spreads globally.[27] An epidemic is wider than an endemic. An example of an epidemic is the spread of the Zika virus, first in Brazil in 2014 and then spread throughout Latin America and the Caribbean islands. Besides, the Ebola epidemic also occurred in West Africa in 2016. However, there is not yet an adequate definition of the term. However, there are some critical ideas for identifying how pandemics are understood, such as it

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[26] Romy Jaster and David Lanius, "Speaking of Fake News," *The Epistemology of Fake News,* 19.

[27] David M Morens, Gregory K Folkers, and Anthony S Fauci, "What Is a Pandemic?" (The University of Chicago Press, 2009).

spreads in a wide range of areas, moves from region to region, infectious, has a relatively high degree of attack, comes from a relatively new disease, has a relatively high lethal risk, and has an increased risk of infection.

On the other hand, the history of very deadly pandemics has occurred around World War I, known as the Spanish Flu. This pandemic could trigger a tremendous economic depression (1929–1932). There was also a plague in the 14th-century, bubonic plague (1347–1351).[28] In the 21st century, pandemics caused by various variants of flu viruses (MERS, SARS, and SARS-CoV-2) have become a challenge for humans because they have changed the pattern of their social life simultaneously and globally.[29] Since December 2019, a mysterious disease has caused many people of Wuhan, China, to get attacked by pneumonia suddenly. Entering the beginning of 2020, the mysterious outbreak, named *severe acute respiratory syndrome coronavirus 2* (SARS-CoV-2) or Covid-19, spread across countries and claimed hundreds of thousands of lives. The *World Health Organization* (WHO), precisely on March 12, 2020, declared Covid-19 as a global pandemic requiring special treatment.[30] Since then, various social distancing policies have emerged and efforts have been made to seek therapy and mass manufacture of vaccines to strengthen immunity.[31]

At the same time, Indonesia declared Covid-19 as a non-natural national disaster based on Presidential Decree No. 12 of 2020.[32] The pandemic has a significant impact on socio-economic life changes and increases the death toll in Indonesia. The data showed that till the end of September 30, 2021, the death reached 4,752,988 and 232,075,351 global

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[28] I Barberis M Martini, V Gazzaniga, N L Bragazzi, "The Spanish Influenza Pandemic: A Lesson from History 100 Years after 1918," *Journal of Preventive Medicine and Hygiene* 60, no. 1 (2019): E64–E67, https://pubmed.ncbi.nlm.nih.gov/31041413/.

[29] Mohammed M Ba Abduallah Maged Gomaa Hemida, "The SARS-CoV-2 Outbreak from a One Health Perspective," *One Health* 10, no. (2020): 100127, https://www.sciencedirect.com/science/article/pii/S2352771420300185?via%3 Dihub.

[30] WHO, "WHO Coronavirus Disease (COVID-19) Dashboard."

[31] Marco Ciotti et al., "The COVID-19 Pandemic," *Critical Reviews in Clinical Laboratory Sciences* 57, no. 6 (2020): 365–388, https://pubmed.ncbi.nlm.nih.gov/32645276/.

[32] KEPPRES, *Keputusan Presiden Republik Indonesia Nomor 12 Tahun 2020 Tentang Penetapan Sebagai Bencana Nasiona* (Jakarta, 2020).

cases of Covid-19. Indonesia itself was confirmed to have 4.2 million (37,412) active issues with 141,826 deaths.[33,34] It means that after the second wave in several countries, Covid-19 is categorized as one of the deadliest pandemics in human history.[35] It also impacts socio-economic aspects such as changes in adaptation to the new normal, various social restriction policies, health protocols; public health awareness increases significantly. Still, it is not directly proportional to the increase in ecological awareness.[36] Ecological awareness, in this regard, is not about changes in the environment as a social space that is inhabited but its relationship to humans during and after the pandemic.

The pandemic discourse in Indonesia is dominated by the complexity of socio-political and public health policy discourses. At the same time, a complete understanding of a pandemic or a covid-19 pandemic is less massive. This is due to the differentiation between the research of laboratory-based scientists and the discourse among politicians about the Covid-19 pandemic. From a philosophical perspective, these two distinctions occur due to differences in the ontological views and epistemological approaches. This gap often occurs when digital communication and socialization of speedy and different social changes are transferred. It causes a difference in people's views when understanding information about the pandemic. In the post-truth digital era, the information intersection is a 'normal' phenomenon. Based on the official government channel report (https://covid19.go.id/p/hoax-

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[33] WHO, "Coronavirus Disease (Covid-19)."

[34] Satgas Covid-19, "Peta Sebaran"; WHO, "Coronavirus Disease (Covid-19)"; WHO, "WHO Coronavirus Disease (COVID-19) Dashboard."

[35] David M. Morens, et all, "The Origin of COVID-19 and Why It Matters," *The American Journal of Tropical Medicine and Hygiene* 103, no. 3 (2020): 955–959, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7470595/.

[36] Rangga Mahaswa; Putu Pradnya Lingga Dharmayasa, "Kesadaran Ekologis Pasca Pandemi: Sebuah Tinjauan Filosofis: A Philosophical Review," *Jurnal Masyarakat dan Budaya* 23, no. 1 (2021): 59–73, https://jmb.lipi.go.id/jmb/article/view/1261/544.; Rangga Kala Mahaswa, "Socio-Catastrophism in the Risk Society: Concepts, Criticism, and Praxis," *Jurnal Sosiologi Reflektif2* 17, no. 1 (2022): 41–74, https://ejournal.uin-suka.ac.id/isoshum/sosiologireflektif/article/view/2514/0.

buster), there was more than 1,140 fake news during the Covid-19 pandemic in Indonesia. Apart from this data, there is a lot of misinformation, conspiracies, and fake news that spread and develop rapidly through social media which then are believed as knowledge about the pandemic.

Today's epistemological approach to Covid-19 is crucial. It is not enough to view it as a biological entity, but as a whole from the supply chain to individual relationships.[37] In addition, many people make things worse by entering fields beyond their expertise, or known as "epistemic trespassing." In this case, Jaana explained the status of *epistemic humility*[38] and non-knowledge, which are applicable as the basis for political decisions during the Covid-19 pandemic. The government's role is to consider epistemic humility to immediately take decisive action while seeking a solid definition of knowledge about Covid-19.[39] Social epistemologists play a significant role in formulating an epistemic attitude view that manages the increasingly widespread ignorance and insecurity due to the government's slow response to take policies.

Beer and Hariman also coined the formulation of catastrophic epistemology during the pandemic. The Covid-19 pandemic crisis has not only challenged public health policy and tested epidemiologists but has also become an epistemological crisis.[40] This crisis involves incompetence,

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[37] Ed Young, "How Science Beat the Virus."

[38] Jaana Parviainen, "We're Flying the Plane While We're Building It': Epistemic Humility and Non-Knowledge in Political Decision-Making on COVID-19," *Social Epistemology Review and Reply Collective* 9, no. 7 (2020): 6=10, https://social-epistemology.com/2021/09/14/towards-an-institutional-account-on-epistemic-humility-and-arrogance-jaana-parviainen-and-anne-koski/.

[39] Jaana Parviainen, Anne Koski, and Sinikka Torkkola, "'Building a Ship While Sailing It.'Epistemic Humility and the Temporality of Non-Knowledge in Political Decision-Making on COVID-19," *Social Epistemology* 35, no. 3 (2021): 232–244, https://www.tandfonline.com/doi/citedby/10.1080/02691728.2021.1882610?scroll=top&needAccess=true&role=tab&aria-labelledby=cit.

[40] Francis A. Beer & Robert Hariman, "Learning from the Pandemic: Catastrophic Epistemology," *Social Epistemology Review and Reply Collective* 9, no. 5 (2020): 19–28, https://social-epistemology.com/wp-content/uploads/2020/05/beer_hariman_learning_from_the_pandemic_serrc_5-8-2020.pdf.

limited knowledge accuracy, and little imagination to structural change during a catastrophic pandemic. Thus, the pandemic can be a lesson to formulate the epistemology of disasters or epistemic catastrophes.

Critical responses are needed to test the validity of scientific knowledge about the Covid-19 pandemic. Fortaleza offers the need for constructive criticism of scientific thinking and practice that can be translated into public health policy and consensus during and after the pandemic.[41] . In addition, the historical and political explanation of microbial epistemology is a unique subject of discussion and has developed since the early 20th century. It has built an epistemic understanding behind the relationship between humans, microbes, and viruses that affect the socio-cultural life of society.[42] Hurlbut also mentioned Indonesia's scientific data access policy during the H5N1 virus pandemic.[43] The relationship between political norms and management of pandemic risk is a controversial topic that discusses obligations, genome data, and sovereignty of a country with world health authorities. The issue of pandemic epistemology can be traced from several cases before the global Covid-19 pandemic.

During the Covid-19 pandemic, sources of knowledge can emerge from social media and other non-scientific channels. Coeckelbergh has examined the challenge of sourcing knowledge about this pandemic as a political epistemology in the post-digital and post-truth era. The pandemic has pushed people's conventional knowledge to switch to digital

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[41] Carlos Magno Castelo Branco Fortaleza, "Emergency Science: Epistemological Insights on the Response to COVID-19 Pandemics," *Infection Control and Hospital Epidemiology* 42, no. 1 (2021): 120–121, https://www.cambridge.org/core/services/aop-cambridge-core/content/view/D94984727491A7965FAFDC838B7208A4/S0899823X20002093a.pdf/emergency-science-epistemological-insights-on-the-response-to-covid-19-pandemics.pdf.

[42] Flavio D'Abramo and Sybille Neumeyer, "A Historical and Political Epistemology of Microbes," *Centaurus* 62, no. 2 (2020): 321–330, https://pubmed.ncbi.nlm.nih.gov/32834061/.

[43] J Benjamin Hurlbut, "A Science That Knows No Country: Pandemic Preparedness, Global Risk, Sovereign Science," *Big Data & Society* 4, no. 2 (2017): 2053951717742417, https://journals.sagepub.com/doi/full/10.1177/2053951717742417.

knowledge in reducing the level of risk during a pandemic.[44] . Fuller sees pandemics in the post-truth era as 'quantum epistemology,' which has never been sought before but is then investigated to confirm its existence.[45] Understanding the latest information as a form of pandemic knowledge in the context of global epidemiology, mitigation strategies, clinical features, pathogenesis, immune response, and the latest developments in vaccines is essential.[46]

Timmermann's study shows that the Covid-19 pandemic has led to the emergence of new problems of poverty as well as epistemic ignorance. It is due to the variety of understandings about the pandemic that causes the uncertainty of a public policy.[47] In addition, a review of epistemic responsibilities can play a role in dealing with the Covid-19 pandemic by building the correct consensus.[48]

Epistemology of testimony (testimony) also plays a vital role in the discussion on pandemic epistemology. This is because the phenomenon of hoaxes and conspiracies that have developed since the spread of the global Covid-19 pandemic can be explained based on an examination of the relationship between epistemic processes such as the placement of the basis for coherence, justification, proof, and reliability of the beliefs formed by one person on the statements or testimonies of other parties such as experts. Based on OECD data, at least four main factors trigger

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[44] Mark Coeckelbergh, "The Postdigital in Pandemic Times: A Comment on the Covid-19 Crisis and Its Political Epistemologies," *Postdigital Science and Education* 2, no. 3 (2020): 547–550, https://link.springer.com/journal/42438/volumes-and-issues/2-3.

[45] Steve Fuller, "A Post-Truth Proactionary Look at the Pandemic," *Postdigital Science and Education* 2, no. 3 (2020): 551–555, https://link.springer.com/article/10.1007/s42438-020-00124-5#citeas.

[46] Zhou Xing Ramandeep Singh, Alisha Kang, Xiangqian Luo, Mangalakumari Jeyanathan, Amy Gillgrass, Sam Afkhami, "COVID-19: Current Knowledge in Clinical Features, Immunological Responses, and Vaccine Development," *The FASEB Journal* 35, no. 3 (2021): e21409, https://faseb.onlinelibrary.wiley.com/doi/10.1096/fj.202002662R.;

[47] Cristian Timmermann, "Epistemic Ignorance, Poverty and the COVID-19 Pandemic," *Asian Bioethics Review* 12, no. 4 (2020): 519–527, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7392120/.

[48] Neil Levy and Julian Savulescu, "Epistemic Responsibility in the Face of a Pandemic," *Journal of Law and the Biosciences* 7, no. 1 (2020): lsaa033, https://academic.oup.com/jlb/article/7/1/lsaa033/5848139.

the emergence of the infodemic. *First*, the people's desire to obtain certainty and definitive answers amid an uncertain situation. *Secondly* is massive and often contradictive information. *Thirdly*, disinformation usually requires high literacy skills in evaluating information. *Fourthly*, the spread of wrong information leads to misleading in closed sectors such as short messages or family groups.[49]

Studying the epistemology of a pandemic is not just how the pandemic affects the spread of information through misinformation, fake news, or pseudo-science. However, it is also necessary to review the ontological basis of the virus transmission from human to human in a much more comprehensive paradigm. The pandemic has given a clearer understanding of the virus and its causative agent, which is still inadequate. Bowker and Star explain that scientific knowledge, practical action, and moral judgment are very dependent on how a phenomenon is conceptualized.[50] Thus, critically building a pandemic and virus epistemology is a crucial thing to do.

Generally, viruses are accepted for their existence when specific symptoms of a disease appear to the surface. Virologist Alexander Gorbalenya, the article's primary author, classifying and naming SARS-CoV-2[51] and has long grumbled that view. There are various approaches to identify the ontological status of viruses. Dupré and Guttinger view the virus not as a microscopic individual entity but as a living process. In the same vein, social anthropologist Lowe explains that viruses are dynamic and that their interactions are like 'clouds' or swarms rather than entities. On the other hand, there is a view that has a strong tendency to link viruses

[49] O. E. C. D., "Transparency, Communication and Trust: The Role of Public Communication in Responding to the Wave of Disinformation about the New Coronavirus."

[50] Geoffrey C Bowker and Susan Leigh Star, *Sorting Things out: Classification and Its Consequences* (MIT press, 2000).

[51] Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, "The Species Severe Acute Respiratory Syndrome-Related Coronavirus: Classifying 2019-NCoV and Naming It SARS-CoV-2," *Nature microbiology* 5, no. 4 (2020): 536, https://pubmed.ncbi.nlm.nih.gov/32123347/.

with diseases that are dangerous to humans. At the same time, there is a strong tendency to ignore viruses as living things, restricting scientists' ability to appreciate the ecological role of viruses and their role in the evolution of humans and other species. Both approaches are discussed further in the critical analysis of pandemic epistemology.

Naturalism Assumptions of Pandemic Epistemology

Before discussing the pandemic as a naturalism discourse, it is also necessary to have an epistemic understanding of the virus itself as a microscopic individual entity. It is based on the pandemic phenomenon consisting of four stages of the pathogen pyramid. The first is the level of exposure (direct contact between the virus and humans); the second degree is of infection; the third is transmission; the last is the spread of the virus from a local outbreak to a global pandemic. The four stages provide epistemic justification for the existence of a natural dimension when the process of a pandemic phenomenon occurs, from the virus as the primary agent triggering the pandemic.
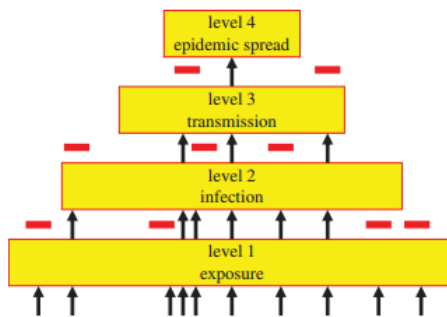

Figure (2). Pathogen Pyramid[52]

Identifying viruses as individual microscopic entities enables the research step by establishing a standpoint for a scientific research process. On the other hand, it is necessary to establish a definitive explanation on a causal basis for a particular phenomenon. For example, flu symptoms can be explained by a virus that causes flu symptoms. The assumption on

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[52] Mark Woolhouse, Fiona Scott, Zoe Hudson, "Human Viruses: Discovery and Emergence."

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identifying the virus as a microscopic individual entity is not just a particular methodological assumption that is informative. But there is also an underlying philosophical assumption. An entity contains a clear boundary and has an intrinsic feature to it.[53] Thus, there is a need for a much more accurate view of viruses as a living process. According to Guttinger,[54] reproductive success is explained through the reproductive machinery, such as the viral enzymes used to replicate the genome and the extent to which they can adapt to specific contexts.

However, based on new findings in virology, it was found that viruses reproduce, showing a different picture of compatibility. Several studies have shown that many viruses, including influenza, HIV, or hepatitis, represent diverse and dynamic populations. The collection of identical particles in these viruses forms what is commonly referred to as "mutant clouds" or swarms. The swarm then develops and replicates within the infected organism. Lauring and Andino explain that based on the quasispecies theory for viruses classified as medically significant, such as HIV, hepatitis C virus, and influenza, the implications for mutation rates are very high and show substantial genetic diversity.[55] This diversity within a swarm allows virus populations to quickly adapt to dynamic environments and develop resistance to vaccines and antiviral drugs. A herd composed of diverse variants, genetically related through mutations and interacting cooperatively at a functional level, then collectively contribute to population characteristics. The swarm does not only work as a whole that relies on specific relationships and contexts. They are formed from a single particle itself which is not an intrinsic feature of the virus particle. This process is only one of several factors in establishing

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[53] John Dupré and Stephan Guttinger, "Viruses as Living Processes," *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 59, no. (2016): 109–116, https://pubmed.ncbi.nlm.nih.gov/26994935/.

[54] Stephan. Guttinger, "A Virus is Not a Thing, Part 1: The Case for a Process View of Viruses."

[55] Raul Andino Adam S. Lauring, "Quasispecies Theory and the Behavior of RNA Viruses," *PLoS pathogens* 6, no. 7 (2010): e1001005, https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1001005.

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genetic diversity in virus populations.

The paradigm shift based on these findings demands an approach change towards isolated particles based on a specific intrinsic property towards the new research methods needed to handle viruses. Some scientists are trying to find new ways of intervening with the dynamics within the swarm rather than focusing solely on the atomic structure of a virus particle. Interventions against the viral system can be carried out by increasing the mutation rate, such as disrupting the balance in the herd, which then leads to the extinction of the virus. Although this approach has its challenges, according to Guttinger, focusing on swarm dynamics is a strategy that goes hand in hand with how viruses act within an infected organism.[56]

Contrary to the previous ideas that focused on examining viruses from a biological perspective, de Chadarevian and Raffaetà argue that it is not enough to study viruses simply by combining biological and social paradigms as they are linked.[57] Understanding viruses and pandemics also requires considering the dynamic interactions between humans and other species in specific historical settings. It is necessary to help us gain valuable insights to live during the pandemic.

Napier explains an assumption of anthropocentrism in the study of viruses. This can be seen through a metaphor where the virus as a living organism attacks humans as its host.[58] This paradigm emerges because of our inability to involve social science in responding to Covid-19. Attitudes towards it tend to make the population in certain circles more vulnerable. To oppose the dominant anthropocentric paradigm, a multispecies approach in anthropology is needed to analyze the situation of virus contact with humans. This can be seen in a specific setting by looking at

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[56] Guttinger, "A Virus is Not a Thing, Part 1: The Case for a Process View of Viruses."

[57] Soraya de Chadarevian and Roberta Raffaetà, "COVID-19: Rethinking the Nature of Viruses," *History and philosophy of the life sciences* 43, no. 1 (2021): 1–5, https://escholarship.org/content/qt97s6h32c/qt97s6h32c.pdf.

[58] A David Napier, "I Heard It through the Grapevine: On Herd Immunity and Why It Is Important," *Anthropology Today* 36, no. 3 (2020): 3–7, https://rai.onlinelibrary.wiley.com/doi/full/10.1111/1467-8322.12572.

it from the human point of view and through the perspective of other species.[59] Furthermore, Kirksey describes Covid-19 as a "multispecies group," an adaptive transformation of the virus in interaction with other life forms. Van Dooren and Kirsey specifically explained that when viewed from different perspectives, such as political, economic, and ecological life, humans often threaten the original habitat of the virus and become the stage for the transfer of virus hosts from animals to humans.[60]

Critical Analysis of Pandemic Epistemological Discourse

Based on the results and previous discussion, there are two main views in explaining the epistemology of a pandemic, i.e., socio-epistemological and naturalistic construction approaches. Both of them provide an adequate explanation and information regarding the epistemic and ontological status of the pandemic. We summarize some of these main views in Table 1. However, there is no guarantee of information consistency for securing knowledge, which is a problem in itself. However, every authority holder (e.g., government or scientist) is obliged to convey the status of knowledge about the pandemic without any particular interests or tendencies to avoid public distrust.

Indonesian government Presidential Decree No. 12 of 2020	The Covid-19 pandemic is a non-natural national disaster.
Jaana Parviainen	Epistemic attitudes during a Pandemic include epistemic humility in managing ignorance or uncertainty about the status of pandemic knowledge.
Francis A Beer dan Robert Harima	The pandemic is in the epistemic catastrophic category due to the

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[59] Eben Kirksey and Stefan Helmreich, "The Emergence of Multispecies Ethnography," *Cultural Anthropology* 25, no. 4 (2010): 545–576, https://anthrosource.onlinelibrary.wiley.com/doi/abs/10.1111/j.1548-1360.2010.01069.x.

[60] Eben Kirksey, "The Emergence of COVID-19: A Multispecies Story," *Anthropology Now* 12, no. 1 (2020): 11–16, https://www.tandfonline.com/doi/abs/10.1080/19428200.2020.1760631?journalCode=uann20.

	inability to cope with structural changes.
Carlos Magno Castelo Branco Fortalez	Epistemology of the pandemic is considered as a public political consensus.
Mark Coeckelbergh	Epistemology of the Covid-19 pandemic belongs to the part of digital epistemic politics.
John Dupré dan Stephan Guttinger	Epistemology of pandemics deals with a microscopic living process. Understanding pandemics or viruses through a multi-disciplinary approach process.
David Napier	Epistemology of pandemics is about a review of anthropocentrism based on a multispecies approach.
Eben Kirksey	Pandemic is an adaptive transformation of viruses in interacting with other life in the context of a multispecies approach.

Table (1). The Summary of Pandemic Epistemology

As explained in the previous section, at least metaepistemologically, several approaches which are realism and antirealism are offered. In this article, the author tries to find an alternative between the two. Based on a review of the two positions, they tend to be inadequate in confronting epistemological factors in pandemics. Realism fails to convince us why we should have faith in science in the fallibility of its epistemic base, which tends to be fragile. On the other hand, antirealism falls into problems if the human mind could create truth; it will fall into radical skepticism because there is no objective truth.

In the current global pandemic era, various disinformation threatening the efficacy and obedience with emergency measures need to

be implemented to deal with the Coronavirus. This creates obstacles to economic and social recovery in the post-pandemic period. The lack of information on pandemic or infodemic data creates different polarization and mistrust. This has long-term negative implications for government action, democracy, and inclusive growth. This influence can be seen in how disinformation significantly affects countries' response in building top-down policies to global pandemics. The overflow in disinformation will likely to undermine the government's responses to the Covid-19 pandemic and put the public health at risk. At the same time, the emergence of distrust tends to lead to dangerous behavior. Citizens' trust and obedience to government policy are critical, from lockdowns to following hygiene protocols. Medical treatments, preventive techniques, and other information are not proven to have attacked the internet and are disseminated by users whose concerns are strengthened by the abundance of conflicting information.

Post-truth reality also has a role and contribution to the foundation or framework of pandemic epistemology. The challenges of digital communication and cyberspace have caused an unlimited amount of information to emerge during the pandemic. In the context of epistemology, the difficulty of verifying testimony and semantic instability strengthens the basis of truth criteria amid a dynamically developing society. The overlapping sources, status, and understanding of pandemic knowledge cause a plurality of views in society. Although in the context of the scientific community, a debate is constantly tested through scientific stages and laboratory tests. In society's social world, the definition of a pandemic is very complicated, especially with the instability of information that develops every day and various factors of conflict of interest and social panic.

Conclusion

An epistemological review of the pandemic has not yet received an in-depth philosophical exploration and investigation. There is a direct

need for scientific communication from any discipline and study of the status of knowledge during the pandemic amid the society. After reviewing the status of knowledge during the Covid-19 pandemic, this study only opens the first way to understand the pandemic and its relationship with nature and humans in a social context. For this reason, an alternative that is not only a guarantee of trust in science but that is also able to provide direction amid uncertain information is needed. Forming the concept of validity that is built critically will secure knowledge. It requires a standardized form of methodological and epistemic that leads to a practical trans-epistemic discourse. The standard aims to criticize the tension of truth between the realism discourse built in the conventions of the scientific community and the sociopolitical turmoil in society. Thus, this study is still open for review and further scientific-philosophical discussions to produce a knowledge framework about pandemics based on a rigorous epistemological review and capable of being considered in a post-pandemic policy.

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