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Konstantina Antiochou
National and Kapodistrian University of Athens, Greece
ORCID: 0000-0002-7244-5565
e-mail: antiochouk@phs.uoa.gr

Stathis Psillos
National and Kapodistrian University of Athens, Greece
ORCID: 0000-0002-2910-5098
e-mail: psillos@phs.uoa.gr

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Transparency, Values and Trust in Science

1. Introduction

Current debates over inductive risk and the role(s) of values in science have largely revolved around the question of the moral responsibilities of scientists: Do scientists have the duty to consider the potential non-epistemic consequences of theories they advocate and, if yes, which (or whose) values should be taken into account in decision-making? In this paper we examine two different – though potentially complementary – responses to this question: a) Heather Douglas's view that scientists should avoid causing reckless or negligent harm to others as a result of the decisions they make[1] and b) Kevin Elliott's Multiple Goals Criterion.[2] These have

1 Heather Douglas, "The Moral Responsibilities of Scientists: Tensions between Autonomy and Responsibility", *American Philosophical Quarterly* 40 (2003): 59–68; Heather Douglas, *Science, Policy, and the Value-Free Ideal* (Pittsburgh: University of Pittsburgh Press, 2009).

2 Kevin C. Elliott, "Douglas on Values: From Indirect Roles to Multiple Goals",

both been developed as a result of the rejection of the value-free ideal and in an attempt to articulate an alternative ideal for science. Douglas makes use of the distinction between direct and indirect roles for values in science, stressing the importance of *how* and *where* values should intervene instead of the question of what these values are, while Elliott's Multiple Goals Criterion is supposed to be more permissive in practice, since it allows for non-epistemic values to be prioritized over epistemic values and influence scientific reasoning. Yet, none of these accounts seems to be applicable in cases where the epistemic goal of truth cannot (or should not) be reconciled with other goals: by rejecting the distinction between epistemic and non-epistemic values, they seem to undermine the difference between competing and/or incommensurable perspectives and responsibilities (e.g., the scientific and the religious).

After a brief presentation of the problem of the moral responsibilities of scientists arising from inductive risk, we discuss in detail the two foregoing accounts and drawing from the case of potential coronavirus transmission by sharing the Holy Communion that recently divided Greek society and medical experts, we show the tensions emerging between autonomy and the moral responsibilities of scientists, when the boundaries of science are blurred and the epistemic goal of truth is inconsistent with (or succumbs to) alternative goals.

2. Challenging the ideal of value-free science

2.1. Inductive risk

In 1953, Richard Rudner[3] argued that the scientist *qua* scientist accepts or rejects hypotheses, which nevertheless involves uncertainty and probability assessments: No scientific hypothesis is ever completely verified. Therefore, in accepting a hypothesis a scientist must make the decision that the evidence is *sufficiently* strong or that the probability is *sufficiently* high to warrant the acceptance of the hypothesis. Such a decision, he argued, is "a function of the *importance*, in the typically ethical sense, of

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Studies in the History and Philosophy of Science 44 (2013): 375–383; Kevin C. Elliott, Daniel McKaughan, "Nonepistemic Values and the Multiple Goals of Science", *Philosophy of Science* 81 (2014): 1–21.

3 Richard Rudner, "The Scientist Qua Scientist Makes Value Judgments", *Philosophy of Science* 20 (1953): 1–6.

making a mistake in accepting or rejecting the hypothesis".[4] It depends, that is, on the risks involved in mistakenly accepting (or rejecting) a hypothesis. Therefore, the scientist *qua* scientist makes value judgements.

Drawing on Rudner's work, Heather Douglas[5] has helped rekindle the philosophical discussion on the 'error argument' over the last two decades. But she extends and develops it in a certain way, by arguing that, contrary to what was thought, the so called 'inductive risk' is present from the beginning and throughout the entire scientific process: in the choice of methodology, in the decision of the models used in science, in evidence characterization, as well as in the analysis or the interpretation of data. In one of her most convincing case-studies regarding dioxin carcinogenicity in laboratory rats, she shows, for example, that both the model selection adopted for gathering data and information, and the choice of a level of statistical significance, require an appropriate balance between the two kinds of error (false positives/false negatives) and therefore a decision on which errors scientists should mostly avoid. If scientists set a high level of statistical significance – and thus decide not to take into account all the (kinds of) evidence – or adopt a 'threshold model' for dioxins, i.e. the assumption of a dose or exposure level to dioxins, below which there are no harmful effects, then dioxins will appear to be safer than they are and no precautionary action will be taken; while adopting a lower level of statistical significance or a no-threshold model may lead to costly and overly restrictive measures. Scientists cannot avoid both of these types of error at the same time, together with the risks resulting from them (of under-regulation or over-regulation respectively, and of public health endangerment or financial cost). Therefore, in making their decisions – and to the extent that the latter have moral implications – scientists are (and should be) influenced and by non-epistemic values.

2.2. Moral responsibilities

The problem with the value-free ideal, the view, i.e., that the justification of scientific claims should not be based on non-epistemic (e.g., moral or political) values, is that it allows scientists to ignore their moral responsibilities, according to Douglas (2009). But precisely because the decisions

4 Ibidem: 2.

5 Heather Douglas, "Inductive Risk and Values in Science", *Philosophy of Science* 67 (4) (2000): 559–579; Heather Douglas, *Science, Policy, and the Value-Free Ideal* (Pittsburgh: University of Pittsburgh Press, 2009).

scientists make are at the same time uncertain – they involve different types of risk that can never be entirely eliminated – and highly important when they have ethical implications, value judgements and norms neither can nor should be excluded from science. As H. Douglas puts it:

> If scientists have the same responsibilities as the rest of us, they have the basic responsibilities we all share for the intended consequences of their choices, as well as for some of the unintended consequences. Specifically, they are responsible for the foreseeable consequences of their choices, whether intended or not. Thus, scientists have the responsibility to be neither reckless nor negligent in their choices.[6]

Scientists act *recklessly* when they consciously and despite being fully aware of the potential consequences take or impose an unreasonable risk, and *negligently*, when they unconsciously do the same.

Douglas[7] distinguishes between the *general responsibilities* that we all hold as full moral agents and *the role responsibilities* that arise from our taking on particular positions in society, and argues that such a distinction should be made in the case of scientists too. 'If the primary goal of science is to develop knowledge about the world, then the role responsibilities of scientists should be structured around this goal', as she says. So, for example, scientists should be honest in the reporting of data. They are expected to share their findings and, in some way, to respond to any valid criticism. These are all *role responsibilities*, that actually 'come with being a scientist'. However, scientists have also *moral responsibilities*, according to Douglas, that arise from the potentially widespread impact of scientific work and involve the attribution of blame or praise. So, scientists have the general responsibility to consider and weigh the foreseeable consequences of error when making socially relevant methodological decisions. Otherwise, they can be blamed for being reckless or negligent.

But what or whose values are allowed in science?

6 Douglas, *Science, Policy, and the Value-Free Ideal*, 71. See also Douglas, "The Moral Responsibilities of Scientists": 59–68; Heather Douglas, "Values in Science", in: *The Oxford Handbook of Philosophy of Science*, ed. Paul Humphreys (New York: Oxford University Press, 2016), 609–630.

7 Douglas, "The Moral Responsibilities of Scientists": 59–68; Douglas, *Science, Policy, and the Value-Free Ideal*.

3. Alternative Ideals

3.1. Direct and indirect roles

Both the inductive risk argument and the responsibilities arising from it for scientists raise a question of the – kind of – non-epistemic values that should be taken into account into decision making. However, Douglas avoids (supposedly) this question following a different reasoning path. In her book[8] she presents a proposal for limited or 'controlled' entry of values into science, an alternative ideal for science, according to which it is not so much the epistemic/non-epistemic distinction or the *kind* of values entering science that matters for the integrity of science, as their *role* (or the way in which values enter into the various phases of research process):

> The crucial normative boundary is to be found not among the kinds of values scientists should or should not consider (as the traditional value-free ideal holds), but among the particular roles for values in the reasoning process.[9]

This role can be either direct or indirect, according to Douglas. Values play a direct role when they 'act as reasons in themselves to accept a claim',[10] while in their indirect role values '[…] determine the importance of the inductive gaps left by the evidence' or they help us to weigh the consequences of an erroneous choice and to decide what should count as *sufficient* evidence for the acceptance (or rejection) of a claim. When, for example, a scientist undertakes a research study out of interest or he refuses to use specific research models and techniques that cause pain or harms to animals, it is her values that affect or even dictate one choice or another, according to Douglas.[11] Because of her values she may decide to deal with a particular subject or to apply a more painless method – in this case that scientist's values play a direct role. As regards, however, the management of inductive risk and the choices or decisions that a scientist should make in the face of uncertainty, the role of values is indirect, in that it is independent of the role of evidence and does not substitute it.

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8 Heather Douglas, *Science, Policy, and the Value-Free Ideal* (Pittsburgh: University of Pittsburgh Press, 2009).

9 Douglas, *Science, Policy, and the Value-Free Ideal*, 88.

10 Ibidem, 96.

11 Ibidem; Douglas, "Values in Science", 609–630.

Douglas claims that this distinction offers a solution to the problem of wishful thinking. She argues that the role of (non-epistemic) values involved in the internal phases of sciences or in whatever has to do with the characterization and interpretation of data should be indirect, so as to be legitimate: values should not override evidence. However, as many of the opponents of the ideal of value-free science have noted, this distinction is neither clear,[12] nor sufficient to prevent wishful thinking or to function as a criterion for distinguishing between legitimate and illegitimate roles for values in science.[13] For there are cases where the role of values may be indirect, but controversial and/or illegitimate in a certain sense,[14] as well as cases where Douglas's criterion fails to justify a legitimate use of values in science. In their decision, for example, of what model to use for extrapolating the high-dose effects of toxic chemicals down to lower doses, it is not clear if toxicologists are indirectly or directly influenced by non-epistemic values, when the evidence for two competing models is equal, as Elliott notes, or which model is correct.[15] We typically do not know scientists' motives or intentions so as to say that their values do not function as reasons for the one choice or the other. We cannot, in fact, easily isolate the belief from the action and/or the decision of a scientist, or distinguish between different epistemic attitudes.[16] For this is what Douglas seems to require here.[17] But even if we admit that such a distinction is possible or that the role of values may be indirect in some cases (when

12 Kevin C. Elliott, "Direct and Indirect Roles for Values in Science", *Philosophy of Science* 78 (2011): 303–324; Elliott, "Douglas on Values": 375–383; Ingo Brigandt, "Social Values Influence the Adequacy Conditions of Scientific Inference: Beyond Inductive Risk", *Canadian Journal of Philosophy* 45/3 (2015): 326–356; Daniel J. Hicks, "A New Direction for Science and Values", *Synthese* 191 (2014): 3271–3295.

13 Elliott, "Direct and Indirect Roles for Values in Science": 303–324; Elliott, "Douglas on Values": 375–383; Hicks, "A New Direction for Science and Values": 3271–3295; Daniel Steel, Kyle Powys Whyte, "Environmental Justice, Values and the Scientific Expertise", *Kennedy Institute of Ethics Journal* 22 (2012): 163–182; Immaculada de Melo-Martin, Kristen Intemann, "The Risk of Using Inductive Risk to Challenge the Value-Free Ideal", *Philosophy of Science* 83 (2016): 500–520.

14 Elliott, "Douglas on Values": 375–383; Steel, Whyte, "Environmental Justice, Values and the Scientific Expertise": 163–182.

15 Elliott, "Douglas on Values": 375–383.

16 Elliott, "Direct and Indirect Roles for Values in Science": 303–324; Elliott, "Douglas on Values": 375–383.

17 Cf. Richard Jeffrey, "Valuation and Acceptance of Scientific Hypotheses", *Philosophy of Science* 23 (1956): 237–246; Sandra Mitchell, "The Prescribed and Proscribed Values in Science Policy", in: *Science, Values, and Objectivity*, ed. Peter Machamer, Gereon Wolters (Pittsburgh: University of Pittsburgh Press, 2004), 244–255.

e.g., the consequences of a mistake are considered), this does not mean that it is legitimate too, especially when there is a conflict of interest.

3.2. Kevin Elliott and the Multiple Goals of Science

In an attempt to address these weaknesses, Kevin Elliott suggests a Multiple Goals Criterion (MGC) as a supplement to Douglas's account, which distinguishes appropriate and inappropriate value influences in science based on the extent to which these values (or influences) advance the goals involved in appraising hypotheses in a particular context. As Elliott put it:

> Multiple Goals Criterion: A particular value can appropriately influence a scientist's reasoning in a particular context only to the extent that the value advances the goals that are prioritized in that context.[18]

Without actually rejecting Douglas's account as a norm for scientific reasoning, Elliott questions the scope of this norm. He argues that it fails to apply in cases where scientists do not (primarily) aim at achieving truths. The coherence of the direct/indirect roles distinction is challenged "[…] whenever scientists are engaged in practical appraisals of hypotheses or theories on the basis of goals that are not purely epistemic".[19] For the pursuit of truth is just one of the multiple goals that scientists may have when choosing scientific representations, according to Elliott.[20] And non-epistemic values are then directly relevant to achieving the aims that are at play. In their decision, for example, whether or not to use a particular model for the purposes of performing risk assessments of potentially carcinogenic compounds, scientists do not aim so much at truth, says Elliott,[21] as at minimizing the social costs associated with over- or under-regulating carcinogens. If, say, they know that no restriction or ban is imposed on the manufacture of a substance and placing it on the market until risk assessments have been completed, they may choose a model with less predictive accuracy – which is supposed to advance and/or indicate truth – for the sake of obtaining quicker results.[22] Elliott argues that the distinction between direct and indirect roles for values in science would not leave such an option open to scientists. It would obviously render the

18 Elliott, "Douglas on Values": 81.

19 Ibidem: 380.

20 Cf. Kevin C. Elliott, Daniel McKaughan, "Nonepistemic Values and the Multiple Goals of Science", *Philosophy of Science* 81 (2014): 1–21.

21 Elliott, "Douglas on Values": 380.

22 Ibidem.

role of the speed with which they could generate results here illegitimate. And he suggests the Multiple Goals Criterion, as he calls it, according to which the role of non-epistemic values in a certain context depends on the goals they advance: When these goals coincide with the goals prioritized in this context, then the role of non-epistemic values is legitimate. But if they do not coincide or the values involved undermine the primary goals of the context, this role is illegitimate.

Elliott's account seems prima facie reasonable. This is because it does justify the role of non-epistemic values in science. It shows that this role can be legitimate, even when it is "direct", as Douglas would say. And, furthermore, it satisfies a basic intuition we have about science, which is that beyond truth, it may pursue some practical goals or aims too. Elliott does not evaluate these goals. He does not, that is, link the appropriateness of the values that intervene in science with the appropriateness of the goals that science pursues. But he distinguishes, instead, between values and goals, and he links the legitimacy of the first with their effectiveness as means for the success of the latter. He refers to a perfectly legitimate relationship between means and ends. However, a first key question that is raised by his account has to do with the connection of the practical goals to the goal of truth. Is it really the case that the latter is an *alternative* among many other goals? Aren't we talking about *important* or *interesting* truths anyway? Or is searching after truth just an optional goal that could be redundant and absent in some cases? If the answer to the latter question is yes, then we could say that the quickest possible way of obtaining the results in the above-mentioned example of chemical risk assessment is cartomancy.[23] We could have faster and, perhaps, more effective models, if we abandoned the goal of truth or just told a lie in the face of the uncertainties surrounding the action of these substances, as we could perhaps sacrifice a few people, if we were interested only in truth about the action

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23 Note that the possibility of the substances in question being mistakenly proved safe through a faster model (when they are in fact harmful) is not taken into consideration. While, that is, Elliott implies that the goal of public health will be better served if these substances are withdrawn from the market as soon as possible, since they are harmful (which for him is related to the use of the faster model), he does not discuss or question the validity of each model. He does not consider whether or not such a goal is served in case of error. But as he argues in a similar case and together with McKaughan (2014, σελ. 17–18), "[…] scientists regard the production of faster results as a 'reason in itself' for choosing the expedited model and not merely as a reason for altering their standards of evidence in response to the possibility that they could be choosing an erroneous model. In fact, they are choosing a more erroneous model on purpose because of its non-epistemic virtues".

of a substance (or to its possible benefits for the many), by using them as laboratory animals.

Elliott does not, of course, claim that the pursuit of one goal precludes the pursuit of another. This is, instead, what he is trying to avoid.[24] He allows for different goals, which are normally prioritized and combined, to be simultaneously pursued. However, he does not take the goal of truth for granted. And while discussing, as a potential objection to his argument, the risk of violating the epistemic standards of science by allowing scientists to appraise models or hypotheses based on practical goals, he does not clearly say whether or not the Multiple Goals Criterion he suggests would legitimize, in a certain context, fraud and falsehood too. He invokes, instead, the distinction between belief and acceptance or decision and argues that the reasons for which scientists accept a hypothesis and decide what to do, are not necessarily dependent on whether or not it is true.[25] Although he rejects this distinction when he criticizes the value-free ideal or Douglas's account, he cannot avoid it either. He points out that the reasons he is talking about are those for deciding to accept a hypothesis. And indeed, he does not merely describe what scientists do. He does not just say that scientists happen to accept a hypothesis for several reasons beyond truth – and by interests or motives they are not always aware of.[26] But he argues instead that scientists should be conscious of their value choices and make them as explicit as possible, so as to allow all stakeholders and science policymakers to evaluate research results and consider alternative solutions, if they want.[27]

This strategy is suggested as a solution to the problem of applying the Multiple Goals Criterion. For as, rightly, Elliott put it:

> Under that criterion, they [scientists] need to be clear not only about whether particular values are epistemic or not but also whether particular values in other categories (e.g., personal, ethical, or political) promote specific goals or aims. Other scientists and citizens could also run into serious confusion if they assume that their colleagues are accepting a hypothesis solely because of its

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24 Cf. Elliott, McKaughan, "Nonepistemic Values and the Multiple Goals of Science": 1–21.

25 Kevin C. Elliott, David Willmes, "Cognitive Attitudes and Values in Science", *Philosophy of Science* 80 (2013): 807–817; Elliott, "Douglas on Values": 380; Elliott, McKaughan, "Nonepistemic Values and the Multiple Goals of Science": 6, 11.

26 Note that for Elliott (2011) scientists cannot distinguish between different epistemic attitudes.

27 Elliott, "Douglas on Values": 382; Elliott, McKaughan, "Nonepistemic Values and the Multiple Goals of Science": 15–16.

> epistemic virtues, whereas in fact the hypothesis has been accepted because of its ability to meet specific practical goals. Therefore, while the Multiple Goals Criterion has great promise for distinguishing appropriate and inappropriate values at a conceptual level, in actual practice it raises significant challenges for individual scientists and for the scientific community.[28]

However, a similar problem applies to Elliott's strategy too. De Melo-Martin and Intemann[29] argue, for example, that scientists are not always aware of the value judgements determining their methodological choices, so as to make them explicit to stakeholders: 'Values can be difficult to identify because they are widely held within the relevant sector of the scientific community',[30] they say. Even if value judgements are recognized and made explicit, it will still be difficult to implement this solution. This is because stakeholders 'may lack expertise necessary to assessing how the adoption of different values could result in different conclusions'.[31] Or they may not be in position to know what conclusions follow from using different value judgements, in case that they possess the expertise. And moreover, any stakeholder involvement in scientific research – assuming they have the required knowledge – could weaken its autonomy[32]. If the whole process of science involves considerations of inductive risk, even in its core, it is obviously difficult if not impossible for policy makers and stakeholders to effectively keep it under control. Value judgements and biases are then more likely to be identified post hoc, i.e., after they have already shaped the science available to inform public policy options, as de Melo-Martin and Intemann[33] claim. Stakeholders cannot act in advance and check or question the power of the scientists to decide what values to endorse. Moreover, we do not know how they would handle the balancing of values whenever faced with inductive risk (if they possessed the knowledge required to consider alternative solutions and their implications) or potential disagreements with scientists on the role of some values. And if we add here Winsberg's[34] reservations; the complexity of the models

28 Elliott, "Douglas on Values": 382.

29 De Melo-Martin, Intemann, "The Risk of Using Inductive Risk to Challenge the Value-Free Ideal": 500–520.

30 De Melo-Martin, Intemann, "The Risk of Using Inductive Risk to Challenge the Value-Free Ideal": 512.

31 Ibidem: 512.

32 Heather Douglas, "The Moral Responsibilities of Scientists": 59–68.

33 De Melo-Martin, Intemann, "The Risk of Using Inductive Risk to Challenge the Value-Free Ideal": 500–520.

34 Eric Winsberg, "Values and Uncertainties in the Predictions of Global Climate Models", *Kennedy Institute of Ethics Journal* 22/2 (2012): 111–137.

used in science; the division of cognitive labour and scientists' failure to identify value influences in their colleagues' sources and analyses or even to detect their own motives, we understand that it would be even more difficult for some third person or party to take on this role.

It is here where Douglas' argument finds its place. We recall that it is scientists who have to consider what levels and kinds of inductive risk are acceptable in the face of uncertainty, according to her. But while the transfer of responsibility for inductive risk management to scientists seems to make it a more feasible option, on a practical level, such an option often gives rise to significant impacts on or risks to the conduct of the scientific research. And it does not always – and unconditionally – guarantee the autonomy of science.

4. The debate on Holy Communion safety in the era of COVID-19 and the responsibilities of scientists. The case of Greece

The concern expressed in Douglas' (2003) and more indirectly in de Melo Martin and Intemann's (2016) articles[35], regarding stakeholder involvement and the implications it might have for the autonomy of science, has to do with the risk of non-experts involved exceeding their authority. It is the risk that stakeholders will ignore scientists if they disagree with them on the values and principles that should govern their research, the likelihood of rejecting all their research[36] or the risk of an illegitimate intervention of moral or political values in scientific research that Douglas points out, if perhaps the values of stakeholders take the place of evidence. Science cannot be said to be autonomous then. However, the question that is raised here is whether such a threat is eliminated by expanding the role and power of scientists to impose their own values on others, firstly, if – and how – we could address this threat, and secondly, if we are not able to say where exactly the role of the scientist as a scientist ends and where their role as a socio-moral subject begins.

To see how difficult it might be for science to be at the same time autonomous and value-laden, once the epistemic/non-epistemic distinction

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35 See Douglas, "The Moral Responsibilities of Scientists": 59–68 and De Melo-Martin, Intemann, "The Risk of Using Inductive Risk to Challenge the Value-Free Ideal": 500–520.

36 De Melo-Martin, Intemann, "The Risk of Using Inductive Risk to Challenge the Value-Free Ideal": 500–520.

is rejected, consider the case of potential coronavirus transmission by sharing the Holy Communion that recently divided Greek society.

Eucharist (or Holy Communion) is the central service of Christian worship. It comes from the Greek word "thanksgiving" and it commemorates the words and actions of Jesus at the Last Supper with his disciples, before his crucifixion. During this meal, Jesus blessed the bread, which he said was his body, and shared it with his disciples. Then he took a cup of wine, gave thanks, and gave it to them, saying "Drink from it all of you. This is my blood of the [new] covenant, which is poured out for many for the forgiveness of sins". According to St Luke, Jesus called on his followers to repeat this meal in his memory (Britannica). And all generations of Christians throughout the world have continued this practice to the present day.

Although the ceremonies of the Eucharist vary among denominations and different time periods, most Christians recognize a special presence of Christ in this rite, and the elements of the Eucharist, the sacramental bread and wine, are placed on an altar or Lord's table and consumed thereafter. A piece of bread is dipped in the consecrated wine and a priest then offers it to each worshipper on a long spoon, which is not wiped between recipients.

The potential for contracting infection or germs from the communion spoon has been hotly debated in the medical literature since the late 19th century, when Forbes and Anders thought that pathogens can be introduced into wine from infected humans who consume it with the same spoon.[37] But while much research effort and discussion has focused on this issue, there has never been a documented case of illness caused by partaking of Holy Communion in the literature.[38] There is experimental evidence suggesting that sharing a communion cup contaminates the wine and cup, but there have been no reports of infectious disease caused by sharing a chalice.[39] And while, for scientists, the risk of infection seems to depend on several factors, such as the bacterial or viral load in the

37 James Pellerin, Michael B. Edmond, "Infections Associated with Religious Rituals", *International Journal of Infectious Diseases* 17 (2013): e945–e948. 10.1016/j.ijid.2013.05.001.

38 Dimitrios Anyfantakis, "Holy Communion and Infection Transmission: A Literature Review", *Cureus* 12/6 (2020): e8741. DOI 10.7759/cureus.8741; Pellerin, Edmond, "Infections Associated with Religious Rituals": e945–e948; Nikolaos Spantideas et al., "COVID-19 and Holy Communion", *Public Health* 187 (2020): 134–135.

39 Anyfantakis, "Holy Communion and Infection Transmission": e8741; Pellerin, Edmond, "Infections Associated with Religious Rituals": e945–e948.

communicants' saliva or the alcohol content of the wine, for the Greek Orthodox Church there is no such risk. Since the *substances* of bread and wine are wholly changed into the body and blood of Christ, or Christ is actually present under the *appearances* of bread of wine, according to the Christian doctrine, there can be no possibility of contracting disease from the elements of the Eucharist.[40]

The COVID-19 crisis has revived the long-standing discussion regarding the potential transmission of infectious diseases through the Holy Communion, and divided Greek society. While religious authorities around the world were taking precautions and the religious practices of millions of people underwent profound changes in response to the novel coronavirus pandemic, the Greek Orthodox Church would often undermine Greece's COVID-19 pandemic measures. It would argue that faith is a sure antidote to the pandemic, and the Holy Synod, the governing body of the Church, would insist that 'the Holy Eucharist […] certainly cannot be a cause of disease transmission'. It would describe media focus on the Holy Communion as 'neurotic', even when Greece was struggling to respond to a deadly second wave of COVID-19, and it would say then again that no disease can be transmitted to people using the same spoon in the Eucharist, despite WHO's recommendations to the contrary.

The attitude of the Church divided politicians. The decision of the ruling New Democracy party to allow churches to self-regulate during the first lockdown when all businesses and schools had been shut down, triggered strong reactions. But it would be a mistake to think that priests and scientists constituted two homogeneous and necessarily opposing groups or that the government just refrained from intervening for fear of the political cost of antagonizing the clergy. This is because both the clergy and the scientific community were divided too. There were priests who did not oppose expert recommendations, or who used scientific arguments when they did it, on the one hand, and epidemiologists who failed to distinguish their role as scientists (and the responsibilities arising from it) from their faith, on the other, when they were asked to advise people. Appearing on a TV programme in the autumn of last year, Dr Athina Linou, a distinguished epidemiologist and professor at the University of Athens, said that 'there is no epidemiological study that proves that the disease is transmitted through ingestion of saliva, including the virus itself', for example.[41] She noted that, since it was a new virus, SARS-CoV-2 had

40 Lawrence G. Lovasik, *The Basic Book of the Eucharist* (New Hampshire: Sophia Institute Press, 2001).

41 Lydia Emmanouilidou, "In Greece, a Clergyman's Death Reignites

not been scientifically proven to be transmitted through ingestion, using a shared spoon.[42] And she concluded that we could not deal with spiritual and Orthodox issues using logic. Just a few months earlier, another expert in the area of infectious diseases, Dr Eleni Giamarelou, had shocked a large part of Greek society, when she argued against the use of personal plastic teaspoons during communion. As she put it:

> We are making a big deal out of nothing. Holy Communion is a sacrament. When you go to receive the Holy Communion, it is not a routine, you receive it because it is the body and blood of Christ. Either you believe it and you receive the Holy Communion, or you don't believe it. There are no compromise solutions, such as teaspoons etc. I am totally against them. If we believe it, we do not tempt fate. If I think this can be a source of infection, then I don't believe in the greatest sacrament.[43]

The distinction that both Linou and Giamarelou make between faith and science is a proper one or at least a legitimate distinction made in the context of the philosophy of science. The contradiction they implicitly assume between one's faith in the mystery of Holy Eucharist and the fear that it offers no protection against infectious diseases is quite obvious, under a certain interpretation of orthodox dogma. However, the two scientists are not limited to this distinction. They do not just say that 'the metaphysical is not proven' or that scientific concepts cannot apply here. That is, they don't just state the argument that faith and science are 'non-overlapping territories'. They say instead that 'people who want to receive the Holy Communion should not be afraid of the fact that it can transmit germs'[44] and when asked if they would receive the Holy Communion at this time, they both replied in the affirmative. 'I will receive the Holy Communion having strong faith in God that I will not catch any disease' says Dr Eleni Giamarelou. 'I tell you what I will do for myself and this is what I believe

Communion Spoon Debate", *The World*, 30.11.2020, access 18.04.2021, https://www.pri.org/stories/2020-11-30/greece-clergyman-s-death-reignites-communion-spoon-debate;"Epidemiology Professor: No Scientific Study that Proves COVID-19 Transmission through Holy Communion", *Orthodox Times*, 14.11.2020, access 18.11.2020, https://orthodoxtimes.com/epidemiology-professor-no-scientific-study-that-proves-covid-19-transmission-through-holy-communion/.

42 Ibidem.

43 "Greek Infectious Diseases Specialist: I Will Receive the Holy Communion Having Strong Faith in God that I Will Not Catch Any Disease", *Orthodox Times*, 6.03.2020, access 15.06.2021, https://orthodoxtimes.com/greek-infectious-diseases-specialist-i-will-receive-the-holy-communion-having-strong-faith-in-god-that-i-will-not-catch-any-disease/.

44 Ibidem.

that everyone should do'.[45] Dr Linou replies in the same way that, of course, she would receive the Holy Communion. And the question that arises here is: in what capacity do they make these statements and how strong or supported by scientific evidence are their arguments for the safety of receiving Holy Communion?

Consider, for example, Giamarelou's argument that 'in Greece there were leprosy patients who were the first to receive the Holy Gifts from the priests, and other people partook of the mystery afterwards, but no one was ever afflicted'.[46] This is a frequently used argument and the case of the priest of Spinalonga Island, Monk Chrysanthos Koutsoulogiannakis, who used to serve Holy Communion to the leprosy patients from the same spoon, is a telling one in this context. For ten whole years Monk Chrysanthos lived with the lepers and partook of the Holy Communion without any precautions. Acting in line with the established Christian Orthodox practice, he used rather to drink all the remaining sacramental material of the chalice after the completion of the ritual. And the fact that he was never contaminated seems to sustain the argument for the safety of Holy Communion. However, no alternative – i.e., scientific – explanation of this fact is discussed in this context. While, for example, the risk of infection depends on several factors, as said, including '[…] the alcohol content of the wine, the linen cloth used to wipe the rim, and the recipient's ability to destroy any pathogenic organism'[47], Giamarelou insists it is a miracle. 'I am not aware of any evidence showing that the virus can spread through the communion spoon […] I insist that there is no world study that demonstrates that the virus is transmitted through ingestion',[48] says in turn Linou, as if the absence of evidence (and/or of certainty) were evidence of absence of transmission risk. Both Giamarelou and Linou underestimate other routes of SARS-CoV-2 transmission during the ritual of the Eucharist, like crowding. And though Dr Linou's statement that '*since it is a new virus*, SARS-CoV-2 has not been scientifically proven to be transmitted through ingestion using a shared spoon'[49] (emphasis added) seems to be closer

45 Ibidem.

46 Elena Konstantinova , "Greek Infectious Disease Specialist: Eucharist Does Not Transmit Infection", *Union of Orthodox Journalists*, 15.05.2020, access 16.05.2020, https://spzh.news/en/news/71361-grecheskij-infekcionist-cherez-svyatoje-prichastije-nelyzya-zarazitysya.

47 Pellerin, Edmond, "Infections Associated with Religious Rituals": 947.

48 Emmanouilidou, "In Greece, a Clergyman's Death Reignites Communion Spoon Debate".

49 Ibidem; "Epidemiology Professor: No Scientific Study that Proves COVID-19 Transmission through Holy Communion".

to the scientific truth – if we overlook the reference to the holy spoon as a potential differentiating factor – such a statement challenges the validity of the analogical inference attempted by Giamarelou: Either SARS-CoV-2 is a new virus, and we lack any evidence showing that it can (*or cannot*) spread through the communion spoon, or the inference by analogy is valid, and since no transmission of virus was detected before, (we can say that) no transmission can occur now.

Neither Linou nor Giamarelou discuss these objections. Nor are they explicit on the supposed evidence there is for their claim that Holy Communion is virus-proof. Although the Greek Federation of Hospital Doctors was quick to denounce medical practitioners who publicly said that coronavirus could not be transmitted through Holy Communion, stressing that no exception "for religious, sacramental or metaphysical reasons" should be made to state health warnings to please the Church,[50] none of their colleagues dared to speak under their own name against the predominant interpretation of Christian dogma. And so, the question that is raised here is whether such an attitude is compatible with the role of a scientist qua scientist and the responsibilities arising from this role. This seems to us to be a clear case in which social values are influencing, if not determining, the scientific beliefs about virus transmission. It is, in other words, a case in which the autonomy of science is compromised.

5. On the applicability of the two alternative ideals in the case of Holy Communion

How would the two accounts discussed so far react to this case? Consider first Douglas's account of science. It is probably clear that non-epistemic values play a *direct* role in this case, as Douglas would say. The religious beliefs of the two eminent scientists seem to act as reasons in themselves in deciding whether or not to accept the claim that Holy Communion is safe, and their role is therefore illegitimate, according to Douglas's ideal of distinctive roles. But there is also a tension here between what Douglas calls *role responsibilities* and the *moral responsibilities* of scientists. This is because the consequences of what scientists assert or deny with regards to religion, as well as of changes in the religious practices of people who

50 "No Coronavirus Risk from Holy Communion, Says Holy Synod", *e-kathimerini.com*, 9.03.2020, access 15.03.2020, https://www.ekathimerini.com/news/250391/no-coronavirus-risk-from-holy-communion-says-holy-synod/.

find comfort and peace in their faith and organized religion, may be devastating for these people. We are not interested here in whether or not (and/or what) scientists believe. We suppose we have no access to scientists' beliefs or motives, and we ask whether they should still be transparent and say it explicitly, if, for example, they believed that Holy Communion was unhealthy. It seems to us that on Douglas's account there is no unambiguous answer. Recall that for Douglas "Scientists have ethical responsibilities not to cause reckless or negligent harm to others when making choices that have foreseeable consequences".[51] Suppose a scientist takes it that there is ample evidence for air-borne transmission of the virus. What should they do? Qua role responsible, they should come out against using the same spoon during the Holy Communion, but qua morally responsible, they might as well refrain from causing harm on religious people who believe that the Holy Communion is virus-proof.

Elliott allows for multiple goals, which are pursued in parallel with that of truth (and which in some cases may take precedence over the latter). However, he does not rule out the possibility that all these goals could be in conflict or even corrupt a scientist's eventual beliefs, in which case there are two responses available for him. First, this problem can be addressed 'by being explicit about the precise goals at play in particular contexts',[52] as he says, in line with Douglas. But when this first solution is insufficient, 'another way to prevent non-epistemic values from having inappropriate influences is to clearly prioritize among the multiple goals at play in a particular context',[53] says Elliott. So, while discussing the case of a scientist who aims to avoid challenging their religious commitments, but they also aim to arrive at true beliefs, Elliott argues that 'this conflict could be settled by determining which aim is of greater importance to the scientist or to the scientific community and regulating the roles for epistemic and non-epistemic values in order to meet the highest-priority goals'.[54]

Does this solution apply to the case we study here? It seems, not to put too fine a point on it, that the solution would be akin to 'anything goes'. If the issue is meeting the highest-priority goal, and if this goal is up for grabs, then all bets are off. The scientist who prioritizes conformity with religious dogma is on a par with the scientist who takes evidence-based and ultimately true beliefs to be the goal.

51 Douglas, *Science, Policy, and the Value-Free Ideal*, 71.
52 Elliott, "Douglas on Values": 380.
53 Ibidem.
54 Ibidem: 380–381.

Besides, we cannot easily say what the primary goal is in this context. For while the religion of Eastern Orthodox Church is an important aspect of Greek culture and a large part of the population identifies with the Christian faith, not all (or even most) of them hold strong religious beliefs. They are not all practicing Orthodox Christians. Some Greeks may be also non-affiliated (e.g., atheist or agnostic) or belong to other religions. So, scientists address a rather motley group of people, with different expectations and moral or political values, so as to prioritize faith over scientific truth and the relevant (non-epistemic) value of public health that is at issue here.

And for exactly this reason scientists cannot easily – or by adopting people's values – gain their trust either.

Both the demand for transparency and the need to share the public's values are often related to the issue of trust in science. It is argued that when scientists do not make clear where and how exactly (non-epistemic) values enter the research process, public trust in science is shaken.[55] 'Insisting that science is value-free, when the arguments and evidence show that this is an unrealistic goal […] may, paradoxically, undermine the public's trust in science',[56] as Elliott and Resnik put it. The public ceases to trust scientists even in cases where they should not do so, such as in the case of climate change, simply because it lacks a proper understanding of the nature of science and of the values involved in it.

So, transparency is proposed as a remedy to this problem and both Elliott and Douglas combine it with a need to share the public's values. Elliott's MGC reflects exactly the need to take the public's interests and values into account. In her more recent work, Douglas argues that shared values used in judgements are a key basis of trust, which means that we should trust the expert who makes judgements as we would, if we had the expertise.[57] But while transparency may undermine the public's trust in science, when the latter fails to meet the public's expectations, or even cause reckless or negligent harm to others (if e.g., it shakes their faith, and the relief they draw form it), to share the public's values may be proved even more problematic, given the heterogeneity of the (non-epistemic)

55 Heather Douglas, "Politics & Science: Untangling Values, Ideologies, and Reasons", *The Annals of the American Academy of Political and Social Science* 658 (2015): 296–306; Kevin C. Elliott, David B. Resnik, "Science, Policy, and the Transparency of Values", *Environmental Health Perspectives* 122 (2014): 647–650.

56 Elliott, Resnik, "Science, Policy, and the Transparency of Values": 648.

57 Heather Douglas, "Trustworthy Science Advice", access 18.05.2021, https://www.youtube.com/watch?v=kz3rImFSrbA.

values involved. Once in the case we study, scientists share the values of that part of society that follows the Church, they may lose the trust of those who expect them to set aside their religious beliefs and act as scientists. And if they challenge believers' faith, they may be accused of the lack of respect for or intolerance of others' values.

To us, all this implies that some kind of distinction between epistemic and non-epistemic values should be in place. 'Considering that ultimately pursuing truth is often a high priority in scientific practice, this might sometimes mean that other goals must be overridden', says Elliott.[58] 'So, for example, the religious scientist might have to entertain unpalatable hypotheses'.[59] But even this may be a quite modest point. The pursuit of truth is part and parcel of doing science. It is not optional and unless we distinguish between this goal (or the epistemic values that promote it) and non-epistemic goals and values, we cannot talk about trustworthy science either.

6. Conclusion

In this paper we have argued that, by rejecting the epistemic/non-epistemic distinction, both Douglas and Elliott fail to distinguish between legitimate and illegitimate value influences. We have shown that the transparency they both require regarding the values guiding scientists' risk assessments and the goals of scientific activity cannot easily accommodate both the need to (re)build public trust in science and the autonomy of scientific research. The idea here is that though transparency can enhance public trust in science, when the non-epistemic values influencing scientists are in conflict with, or fail to, meet public expectations, transparency might well undermine trust. Alternatively, the attempt to meet public expectations may threaten autonomy. However, the distinction between epistemic and non-epistemic values (and contexts or truths) can serve as a basis for a "properly informed trust".

58 Elliott, "Douglas on Values": 381.
59 Ibidem.

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Summary

Current debates over inductive risk and the role(s) of values in science have largely revolved around the question of the moral responsibilities of scientists: Do scientists have the duty to consider the potential non-epistemic consequences of theories they advocate and, if yes, what (or whose) values should be taken into account in decision-making? The paper discusses two different – though potentially complementary – responses to this question: a) H. Douglas's view that scientists should avoid causing reckless or negligent harm to others as a result of the decisions they make and b) K. Elliott's Multiple Goals Criterion. Drawing from the case of potential coronavirus transmission by sharing the Holy Communion that recently divided Greek society and medical experts, it shows the tensions emerging between autonomy and the moral responsibilities of scientists, when the boundaries of science are blurred and the epistemic goal of truth is inconsistent with (or succumbs to) alternative goals. It argues that the balance attempted between scientific principles and religious beliefs was unattainable and concludes that the need to distinguish between epistemic and non-epistemic values (and contexts or truths), which is traditionally related to the ideal of value free science, should be reconsidered and even prioritized among the responsibilities of scientists.

Keywords: responsibility, trust, transparency, epistemic/non-epistemic values, alternative ideals