Against the Value-free Ideal in Science: Reviving the Ontological Choices Argument

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The present paper aims at reviving a recent critique that has been neglected in the general discussion regarding values in science. The Ontological Choices Argument (OCA) proposed by David Ludwig (2016) claims for a rejection of the Value-Free Ideal (VFI). In a nutshell: since the truth of scientific statements is dependent on the ontological choice made, and this, in turn, is dependent on non-epistemic values, then these kinds of values are an integral part of scientific practice (Sect. 1.1). For the ontological level could be beneficial for scientific practice. At the same time, this will open up the possibility to reconsider the map of knowledge fields as it has been built so far. Multidisciplinarity and inclusion will be proposed as the keys to get rid of the soft/hard distinction among the sciences and overcome the concept of epistemic purity.

Keywords: CValues, Science, Ontology, Dermatology, Choice

Introduction[1]

It is customary nowadays to divide the process of scientific discovery in three contexts[2]: context of discovery, context of justification, and context of application. It is also widely agreed that value judgements operate *necessarily* in the first and third stage. The problems arise when we consider how (and if) scientists justify and accept their theories. Are value judgements entailed in this process? And, if they are, are they *necessarily* entailed? The Value-Free ideal (VFI) in science replies negatively to the previous questions. A *strong* interpretation simply denies values *any* role. Both *descriptive* and *normative* issues arise from such a formulation. For one, biases are often unavoidable. In addition, a good scientific theory couldn't be one without comprising values. Thomas Kuhn[3], for instance, famously identifies five characteristics that exceed the factual realm: accuracy, consistency, scope, simplicity, and fruitfulness are values to be held in great account when choosing between competing theories[4].

VFI can then be suitably revised in a more acceptable *weaker* version. While recognizing the presence of values and endorsing some kinds of them, this interpretation still advocates for the necessity of reducing as much as possible the influence of other kinds deemed problematic. This vision has recently been held by the Group of Chief Scientific Advisors (GCSA) in the *Scientific Advice to European Policy in a Complex World* in 2019 addressed to the European Commission. In the first Recommendation – subtitled "Clarify boundaries between science, scientific advice, and politics" – GCSA states:

> Values, beliefs, opinions and competing interests are integral to society and politics. To be trusted and credible, scientific evidence and its analysis must, as much as possible, be clearly differentiated from such factors when advising on

1 - I thank prof. Ghijsen for introducing me to the fascinating topic of values in scientific practice. The first draft of this paper was born as the product of his teaching, and the last version of the present work benefitted greatly from his comments. I also must thank my supervisor, prof. Valore, for his constant and fundamental support during the subsequent phases of revision and expansion of this article. The example case in Dermatology is borrowed from one of his latest and groundbreaking works (cf. P. Valore, *Ontological relativity and conceptual analysis as theoretical frameworks for epistemic injustice: Exploring applications*, in «Metaphilosophy», 55 (2024), pp. 264-279).

2 - T. Henschen, *How strong is the argument from inductive risk?*, in «European Journal for Philosophy of Science», 11 (2021/3), 92.

3 - T.S. Kuhn, *Objectivity, Value Judgement, and Theory Choice*, in T. Kuhn, *The Essential Tension: Selected Study in Scientific Tradition and Change*, edited by T. Kuhn, Chicago University Press, Chicago, pp. 320-339.

4 - Kuhn's proposed values ended up being called "epistemic". On the debate surrounding this category more will be said below.

> policy decisions. Science (and scientific advice) themselves are not completely value-free but scientific advice must not be driven by partisan interests and stealth issue advocacy. The boundaries between science, scientific advice, and policy – and thus the mandate for scientific advice – must be clear[5].

Furthermore, some more recent works claim weak VFI to be not only pursuable, but even *desirable*[6].This version of VFI has been widely criticized by at least four common arguments. The *first* claims that non-epistemic values are structurally unavoidable in science since its theories are underdetermined by evidence[7]. The *second* – named *semantic critique* by Betz[8] – relies on the notion of "thick ethical concepts" and argues that, even in scientific languages, factual and normative components are so inextricably entangled that it is impossible to separate them[9]. The *third* challenges the very distinction between acceptable and unacceptable values in science[10]. The debate has touched upon different ways to categorize values[11] that, anyway, have always raised irresolvable concerns. The *fourth* – named *methodological critique* by Betz – is known as Argument from Inductive Risk

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5 - Group of Chief Scientific Advisors, *Scientific Advice to European Policy in a Complex World*, Scientific Opinion, 7 (2019), Publications Office of The European Union, Luxembourg, here p. 7.

6 - For example: T. Menon - J. Stegenga, *Sisyphean science: why value freedom is worth pursuing*, in «European Journal for Philosophy of Science», 13 (2023/4), 48.

7 - H.E. Longino, *The fate of knowledge*, Princeton University Press, Princeton 2002; M.J. Brown, *Values in science beyond underdetermination and inductive risk*, in «Philosophy of Science», 80 (2013/5), pp. 829-839.

8 - G. Betz Gregor, *In Defence of the Value Free Ideal*, in «European Journal of Philosophy of Science», 3 (2013), pp. 207-220.

9 - H. Putnam, *The Collapse of The Fact/Value Dichotomy and Other Essays*, Harvard University Press, Cambridge 2002; J. Dupré, *Fact and value*, in *Value-free science? Ideals and illusions*, edited by H. Kincaid-J. Dupré-A. Wylie, Oxford University Press, New York 2007, pp. 27-41; A. Alexandrova, *Can the Science of Well-Being Be Objective?*, in «British Journal of Philosophy of Science», 69 (2018), pp. 421-445 goes in the same direction by proposing the notion of "mixed claims", i.e. «causal or correlational claims with […] normative presuppositions [that] mix the normative and the empirical in a way that ordinary scientific claims do not».

10 - P. Rooney, *On values in science*, in PSA: Proceedings of the biennial meeting of the philosophy of science association, 1 (1992), pp. 13-22.; H.E. Longino, *Cognitive and Non-Cognitive Values in Science: Rethinking the Dichotomy*, in *Feminism, Science, and The Philosophy of Science*, edited by Lynn Hankinson Nelson, Jack Nelson, Kluwer Academic Publisher, Dordrecht 1996, pp. 39-58; P. Machamer - H. Douglas, *Cognitive and social values*, in «Science and Education», 8 (1999/1), pp. 45-54; L. Laudan, *The Epistemic, the Cognitive, and the Social*, in *Science, values, and objectivity*, edited by Peter Machamer, Gereon Wolters, University of Pittsburgh Press, Pittsburgh 2004 pp. 14-23; D. Steel, *Epistemic values and the argument from inductive risk*, in «Philosophy of Science», 77 (2010/1), pp. 14-34.

11 - For instance, epistemic/non-epistemic; cognitive/non-cognitive.

(AIR) and has seen many different formulations[12] and many more critiques[13].This paper's goal is to revive a recent argument that has been neglected in the nowadays debate regarding values in science and that, however, is probably the most conclusive among the ones that argue for a rejection of the VFI. The Ontological Choices Argument (OCA) has been proposed by Ludwig[14] and represents a strong account that by itself makes a powerful critique to the VFI. In a nutshell, Ludwig[15] claims that since the truth values of scientific statements depend on ontological choices, if these last, in turn, depend on non-epistemic values (as they often do), then VFI is undermined as it is not possible to avoid value-laden ontological commitments. It is important to clarify what counts as an "ontological choice" in this context. Following Quine, I understand ontological choices as commitments to domains of entities that must be quantified over to make a theory's propositions true – what we might call regional ontologies internal to specific scientific practices. When a scientist adopts a theory, she implicitly or explicitly privileges one of its different ontological interpretations. To resort to agnosticism about such choices would make the determination of truth values impossible, as we will see by following Ludwig. Before the three scientific contexts that we distinguished before, then, it is important to add the *ontological choice stage* that shapes all the subsequent steps (Sect. 1.1). This approach differs importantly from projects in naturalized metaphysics that seek unified ontological frameworks grounded in

12 - E.g.R. Rudner, *The Scientist Qua Scientist Makes Value Judgments*, in «Philosophy of Science», 20 (1953/1), pp. 1-6; H. Douglas, *Inductive Risk and Values in Science*, in «Philosophy of Science», 67 (2000/4), pp. 559-579; H. Douglas, *Science, Policy, and the Value-Free Ideal*, University of Pittsburgh Press, Pittsburgh 2009; K. Steele, *The Scientist qua Policy Advisor Makes Value Judgments*, in «Philosophy of Science», 79 (2012/5), pp. 893-904; K.C. Elliot, *Douglas on values: From indirect roles to multiple goals*, in «Studies in History and Philosophy of Science Part A», 44 (2013/3), pp. 375-383; S. John, *Inductive risk and the contexts of communication*, in «Synthese», 192 (2015/1), pp. 79-96.

13 - E.g.R. Jeffrey *Valuation and Acceptance of Scientific Hypotheses*, in «Philosophy of Science», 23 (1956/3), pp. 237-246; I. Levi, *On the seriousness of mistakes*, in «Philosophy of Science», 29 (1962/1), pp. 47-65; E. McMullin, *Values in Science*, in «PSA: Proceedings of the biennial meeting of the philosophy of science association», 2 (1982), pp. 3-28; G. Betz, *In Defence of the Value Free Ideal*, in «European Journal of Philosophy of Science», 3 (2013), pp. 207-220; G. Schurz, *Philosophy of science: A unified approach*, New York, Routledge 2013; G. Contessa, *On the mitigation of Inductive risk*, in «European Journal for Philosophy of Science», 11 (2021/3), 64; T. Henschen, *How Strong is the Argument from Inductive Risk*, cit.; R. Hudson, *Should We Strive to Make Science Bias-Free? A Philosophical Assessment of the Reproducibility Crisis*, in «Journal for General Philosophy of Science», 52 (2022), pp. 389-405; P. Hoyningen-Huene, *Objectivity, value-free science, and inductive risk*, in «European Journal for Philosophy of Science», 13 (2023/1), 14.

14 - D. Ludwig, *Ontological Choices and the Value-Free Ideal*, in «Erkenntnis», 81 (2016), pp. 1253-1272.

15 - *Ibid.*, cit., p. 1254.

fundamental physics[16]. While such projects aim to determine what ultimately exists at the most fundamental level, OCA is concerned with the multiplicity of working ontologies across different scientific domains and contexts[17]. My argument therefore remains internal to scientific modeling rather than making claims about ultimate metaphysical reality. The critical point is that these ontological choices – however we interpret their metaphysical status – remain consequential for scientific practice and carry value-laden implications that undermine VFI. Ludwig's formulation can, however, be criticized by resorting to an argument inspired by Betz. Relying on Betz's argument, it is possible to claim for VFI the possibility to generate a scientific language/ontology that contains only *well-established* factual statements/facts, empirically tested beyond reasonable doubt and successfully acted upon millions of times[18]. Thus, the "*epistemic purity*"[19] that VFI strives for would be achieved (so to say) from the *bottom* – i.e. from the results of scientific practice itself – rather than from the *top* – i.e. from assuming the correct values. In fact, while Ludwig rightly argues that it is not possible to avoid any ontological commitment, Betz's argument can be put at work on another level of criticism. An even weaker VFI formulation can, indeed, positively assent to Ludwig's argument and welcome non-epistemic values in the context of justification. In fact, it is not the necessary presence of non-epistemic value judgements in science to pose an issue to VFI, rather the necessary presence of *problematic* non-epistemic value judgements. Non-epistemic values are perceived as more prone to let *problematic* values slip into the context of judgement (Sect. 1.2).

However, Betz inspired counter-argument would lose its strength if the proposed *unproblematic* character of well-established factual statements were shown to be false. An example case in Dermatology will be presented precisely in order to claim that even the most innocent, daily, and well-established facts often hide hideous

16 - J. Ladyman - D. Ross, *Every Thing Must Go: Metaphysics Naturalized*, Oxford University Press, Oxford 2007; S. French, *The Structure of the World: Metaphysics and Representation*, Oxford University Press, Oxford 2014.

17 - An interesting topic of discussion would be to consider whether OCA is compelling even beyond scientific practice, i.e. in human practices that do not maintain truth in so high regard (e.g. art), or if its force remains rather confined into the borders of scientific modeling. Such a theme falls way beyond the scope of the present endeavor. However, I find N. Goodman's, *Way of Worldmaking*, Hackett Publishing, 1978 arguments to be quite convincing on the matter. If regional ontologies, whether scientific or not, can be interpreted as right symbol systems, then there is no serious distinction to be drawn between a metaphysical commitment from, say, fundamental physics and a specific theory in aesthetics. However, to proceed further down this path would mean to thoroughly discuss Goodman's controversial many worlds theory and his philosophical account on rightness; thus, moving well beyond the theme under present consideration.

18 - G. Betz, *In Defence of the Value Free Ideal*, cit., p. 215.

19 - T. Henschen, *How Strong is the Argument from Inductive Risk*, cit., p. 92.

biases that, if assumed uncritically, lead to concrete political and ethical problems (Sect. 2).

Finally, the last section will draw the conclusion that VFI should be abandoned. In doing so, other interesting working possibility will open up. By reviving OCA it will be argued that a greater consideration for the ontological level could be beneficial for scientific practice. At the same time, this will open up the possibility to reconsider the map of knowledge fields as it has been built so far. Multidisciplinarity and inclusion will be proposed as the keys to get rid of the *soft/hard* distinction among the sciences and overcome *epistemic purity*.

1. Ludwig's OCA And a Possible Counter-Argument

1.1 OCA in Ludwig's Formulation

Ludwig's argument for OCA goes as follows:

Premise 1: The truth values of scientific statements depend on ontological choices.

Premise 2: Ontological choices depend on non-epistemic values[20].

Conclusion 1: The truth values of scientific statements depend on non-epistemic values.

Premise 3: If the truth values of scientific statements depend on non-epistemic values, then we should reject VFI.

Conclusion 2: We should reject VFI[21].

As for Premise 1 Ludwig maintains that, putting aside any kind of conventionalism[22], it is pretty rare to find a scientific regional ontology in which there clearly is only one *epistemologically superior* account that is able to "carve nature at its joints" across all the contexts of application and for every explanatory interest[23]. Ludwig proposes the following example:

a) There are two different Tiger species in the San Diego Zoo.

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20 - Ludwig accepts the problematic epistemic/non-epistemic distinction since he claims he doesn't want his argument to be dependent on other critiques, D. Ludwig, *Ontological Choices*, cit., p. 1260. Thus, we also will do the same by using the term "non-epistemic" in an operational and minimal sense of values not directly tied to truth conduciveness.

21 - *Ibid.*, p. 1265.

22 - I.e. «a philosophical position that considers the boundaries of entities to be conventional constructions and rejects any realism whatsoever», (in D. Ludwig, *Ontological Choices*, cit., p. 1258).

23 - *Ibid.*, p. 1259.

Let's assume that there are Bengal Tigers (*Panthera tigris tigris*) and Sumatran Tigers (*Pathera tigris sumatrae*) in the San Diego Zoo[24]. If we adopt the "biological species concept", two populations belong to the same species if they are able to produce fertile offspring of both sexes[25]. Bengal and Sumatran Tigers are able to do so, thus, (a) would be false. However, if we were to adopt the "phylogenetic species concept", then species would be defined as "the smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent"[26]. Since Bengal and Sumatran Tigers are different clusters in this sense, then (a) would be true. Ludwig coherently concludes that the truth value of (a) therefore depends on the account of species that is used in developing a biological ontology. It is not hard to see how the same pattern occurs over and over across all scientific regional ontologies.

In order to support Premise 2, namely that non-epistemic values do play a role in ontological choice, Ludwig claims explanatory interests to be often shaped by non-epistemic values. He considers again Mayr's "biological species concept" that enabled to distinguish between two different species of mosquitoes within the *Anopheles* complex, therefore providing an explanation of the distribution of malaria in Europe. A traditional "morphological species concept" wouldn't have enabled biologists to distinguish between two species because of the morphological similarities of mosquitoes within the *Anopheles* complex[27]. Now, we can clearly see which concept is more attractive in the European context: researchers are interested in explaining why malaria is distributed as such, therefore their ontological choice is directed towards the "biological" rather than the "morphological" concept. But this explanatory interest is, in turn, affected by non-epistemic interests. Ludwig writes: "The ability to discern different species within the *Anopheles* complex is an impressive example for the explanatory benefits of the biological species concept *because* we care about human diseases and therefore also about the distribution of Malaria"[28].

Furthermore, Ludwig argues that often ontological choice is directly shaped by non-epistemic factors. For example, the Alabama sturgeon (*Schaphihrinchus*

24 - *Ibid.*, p. 1255.

25 - E. Mayr, *Principles of systematic zoology*, McGraw-Hill, New York 1969.

26 - J. Cracraft, *Species concepts and speciation analysis*, in «Current Ornithology», 1 (1983), pp. 159-187, here p. 170; J. LaPorte, *Natural kinds and conceptual change*, Cambridge University Press, Cambridge 2009, pp. 70-76.

27 - P. Kitcher, *Species*, in «Philosophy of Science», 51 (1984), pp. 308-333.

28 - D. Ludwig, *Ontological Choices*, cit., p. 1261.

suttkusi) is a critically endangered fish[29]. Only recognizing it as a distinct species would place it on the Endangered Species List and lead to conservation measures strongly opposed by the industrial interest group along the Alabama River. This led to an intense political, scientific, and legal struggle. Ludwig concludes:

> The case of the Alabama sturgeon is a helpful reminder that biological taxa often become agents in complex networks that include diverse entities such as the US Fish and Wildlife Service, industrial lobby groups, legal documents and laws, environmental activists, conservation policies and budgets, and so on. The introduction or elimination of taxa as well reconsiderations of their boundaries can have considerable effects on these networks[30]. It is therefore a misunderstanding to think that the choice between different species ontologies will exclusively reflect explanatory issues[31].

Ludwig goes on to consider a possible critique to his argument. One of the main criticisms raised against the Argument from Inductive Risk (AIR) is that scientist's job is not to accept or reject theories, rather to present *hedged hypothesis* expressing uncertainties on the basis of their research[32]. By not accepting or rejecting any theory, the VFI defender is able to avoid committing to any value judgement. In the same way, if the scientist is able to produce conditionalized statements, or assign range of probabilities to the different competing theories, she is then also able to avoid any ontological choice. Ludwig cleverly replies that it is not possible to consider every account of a concept: it is necessary to select a relevant subset for the context. It is, in fact, impossible to consider the whole logical space. But this is already an ontological choice. He then goes on concluding that: "In order to get to the empirical issues, scientists need to specify the boundaries of entities and ontological choices are therefore ubiquities in scientific practice"[33].

Following down the path Ludwig indicates, we can thus claim that, in order to access scientific practice, scientists must already have made their ontological choices. This stage is, therefore, a preliminary and necessary step of science. Failing to acknowledge the existence of the *ontological choice stage* means to

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29 - C. Scharpf, *Politics, science, and the fate of the Alabama sturgeon*, in «American Currents», 26 (2000/3), pp. 6-14; cf. R.G. Winther Rasmus - J.M. Kaplan, *Ontologies and politics of biogenomic "Race"*, in «Theoria», 60 (2013/136), pp. 54-80, here footnote 15.

30 - Cf. B. Latour, *Pandora's Hope: Essays on the Reality of Science Studies*, Harvard University Press, Cambridge 1999.

31 - D. Ludwig, *Ontological Choices*, cit., p. 1264.

32 - G. Betz, *In Defence of the Value Free Ideal*, cit., p. 213.

33 - D. Ludwig, *Ontological Choices*, cit., p. 1268.

blind oneself to the problematic non-epistemic factors that are intrinsically or voluntarily smuggled in, and that influence all the subsequent levels of scientific practice (context of judgement included).

This is certainly true and evident for more *soft* sciences – like social sciences and humanities – but it holds even for *harder* ones – like biology[34] and medicine (Sect. 2): the work done by Valore, Dainotti, and Kopczynyński[35] is a good example of how the choice among different metaphysical and ontological backgrounds is decisive in dealing with the problem of selection biases in astrophysics.

1.2 Betz Inspired Critique

A further critique can be raised against Ludwig's formulation. Again, it was originally proposed in the discussion regarding AIR by Betz. The argument goes as follows:

Premise 1: If a scientific statement is as well confirmed as well-established facts, then its fundamentally irreducible uncertainty is not *decision-relevant* or *problematic*.

Premise 2: There are scientific statements that are as well confirmed as well-established facts.

Conclusion: Their fundamentally irreducible uncertainties are not *decision-relevant* or *problematic*.

It is an accommodating argument since it accepts the fundamental irreducibility of uncertainty, and thus the necessity of resorting to value judgments (not always only epistemic) in the production of scientific statements. At the same time, Betz introduces the concept of "well-established facts". These are scientific statements that "have been thoroughly empirically tested, [and that] have been successfully acted upon millions of times"[36]. Betz argues that, in these cases, uncertainty is deemed not *decision-relevant* or *problematic*. Furthermore, he claims that a well-established social practice relies on this kind of facts for decision making. They compose a "vast corpus of empirical statements which decision makers – in private, commercial or public contexts – rightly take for granted as plain facts"[37].

This argument is very strong on the logical level. If Betz is right, then he is able to defuse AIR: even if we are forced to accept non-epistemic value judgements in

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34 - *Ibid.*, p. 2016.

35 - P. Valore - M.G. Dainotti - O. Kopczyński, *Ontological Categorizations and Selection Biases in Cosmology: The Case of Extra Galactic Objects*, in «Foundations of Science», 26 (2021), pp. 515-529.

36 - G. Betz, *In Defence of the Value Free Ideal*, cit., p. 215.

37 - *Ibidem*.

the context of justification, we can accept only *non-problematic* ones. As a matter of fact, the whole problem of values in science is not that non-epistemic judgements are necessarily implicated, rather, that their presence leads more easily to let *problematic* values slip unsupervised in the context of justification, potentially acting *directly* as reasons for the choice of one theory[38].

Let's now adapt Betz's argument for OCA. Ludwig claims that ontological choice is unavoidable in scientific practice. At the same time, ontological choice is directly or indirectly dependent on explanatory interests and non-epistemic factors. Thus, it is argued, choosing an ontology (or a subset of them) means being dependent on non-epistemic factors. So far, I argue, a weak VFI defender can give her assent. In fact, she can even accept non-epistemic factors in the context of judgement without being forced to abandon VFI. She could claim that, if it were possible to produce a scientific ontology resorting only on well-established facts, we would indeed be relying on non-epistemic value judgements by accepting them (thus overcoming uncertainty), but this kind of judgements would be unproblematic. The argument would go as follows:

Premise 1: If we can choose an ontology composed only by well-established facts, then the non-epistemic factors on which the ontological choice depends are *non-problematic*.

Premise 2: We can choose an ontology composed only by well-established facts.

Conclusion: The non-epistemic factors on which the ontological choice depends are *non-problematic*.

Admittedly, we could try to generate well-established-facts-only ontologies. The fact that there are none of them available does not exclude this possibility. Furthermore, even if we were concretely unable to produce one, a weak VFI defender could argue that we should strive for such an ideal ontology.

The argument seems steady from a logical point of view. However, we can already outline some difficulties that we encounter when we leave the formal dimension and we start analyzing the content one. First, Betz does not provide a clear heuristic that enables us to identify such "well established facts". The formulation is too vague and in need of clarifications to be concretely useful. In this process, we should be very careful not to impose too strict requirements. An unwanted consequence in such a scenario could be to discourage innovative proposals from adopting approaches that do not rely on "well established facts" so defined. Second, and more importantly, that "well established facts" are

38 - H. Douglas, *Science, Policy, and the Value-Free Ideal*; cf. K.C. Elliot, *Douglas on values: From indirect roles to multiple goals*.

unproblematic is a *wrong* assumption. Indeed, often the presuppositions that we take for granted are the most harmful ones. In what follows, an example case will be considered in order to sustain this last claim.

2. Example Case: Fitzpatrick's Skin Type Classification Scale

Thomas Fitzpatrick [39] developed his Skin Type Classification Scale (Table 1) as an aid to research into the tanning potential of human skin. Originally, its purpose was to classify individuals with white skin in order to select the correct amount of UVA in Joules/cm^2 for PUVA treatment for psoriasis. In a later work by Fitzpatrick [40], the main parameter shifted from eye and skin color to the ability for the skin to tan when exposed to UV radiation. Fitzpatrick's classification superseded the widely used Von Luschan's chromatic scale: the latter was popular at the beginning of the 20th century for anthropometry and racial studies [41].

Table 1 Current Fitzpatrick's type classification based on sun-tanning potential compared to Von Luscan's numerical classification based on skin color [42].

Fitzpatrick type	Von Luschan's chromatic scale	Correlation with tanning potential
I	0-6	Always burns, never tans
II	7-13	Usually burns, minimal tanning
III	14-20	Occasionally burns, usually tans uniformly
IV	21-27	Rarely burns, always tans well
V	28-34	Very rarely burns, tans very easily
VI	35-36	Never burns, always tans

39 - T.B. Fitzpatrick, *Soleil et Peau*, in «Journal de Médicine Esthétique», 2 (1975), pp. 33-34.

40 - T.B. Fitzpatrick, *The validity and practicality of sun reactive skin types I through VI*, in «Archives of Dermatology», 124 (1988), pp. 869-871.

41 - N.G. Jablonski, *The evolution of human skin and skin color*, in «Annual Review of Anthropology», 33 (2004), pp. 585-623; P. Goon et al., *Skin cancers in skin types IV–VI: Does the Fitzpatrick scale give a false sense of security?*, in «Skin Health and Disease», 1 (2021/3), e40.

42 - P. Goon et al., *Skin cancers in skin types IV-VI*.

Pichon[43] interestingly reports that initially the scale comprised only skin-types from I to IV. Type I referred to white individuals with fair skin, blue or hazel eyes, and blond or red hair who always burn and never tan. Type II was a subgroup of type I individuals that could develop a light tan. Dark-haired or brown-eyed individuals, who rarely burn and tan more than average, were classified as type IV. Type III was a subgroup of type IV individuals who sometimes could experience a mild burn and develop a moderate tan. Type V and VI were added only later and corresponded to brown and black skins.

The use of Fitzpatrick's scale as a standard self-report measure, however, is problematic. Goon[44] reports that both the general population and the community of people of color underestimate the risks of skin cancer for darker skins[45]. Furthermore, dark-tone-skinned people are less likely to use sunscreen, to report sunburn, or to ask for examinations. Goon[46] stresses that, even if the risks of developing skin cancers are lower in colored people, when developed these cancers tend to be associated with higher morbidity and mortality due to delayed diagnosis[47].

The history of Fitzpatrick's scale reported by Pichon[48] shows us that we need to deal with its ontological assumptions. The classification was developed by assuming as "normal" or "paradigmatic" cases white-skinned individuals. In their study conducted on a random, statewide sample of 2085 California Blacks adult, Pichon reports that "African Americans (and other brown-skin groups) do not conceptualize or label their skin's reaction to the sun as tanning (turning brown) or burning (turning red)"[49]. Thus, the simple extension of the scale to dark-tone skinned individuals (from a I to IV scale to a I to VI scale) is not effective in order to prevent skin cancers through self-reports.

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43 - L.C. Pichon, *Measuring Skin Cancer Risk in African Americans*, in «Ethnicity & Disease», 20 (2010a), pp. 174-179.

44 - P. Goon et al., *Skin cancers in skin types IV-VI*.

45 - M. Kim, *Perception of skin cancer risk by those with ethnic skin*, in «Archives of Dermatology», 145 (2009/2), pp. 207-208; R.M. Halder - S. Bridgeman Shah, *Skin cancer in African Americans*, in «Cancer», 75 (1995/2), pp. 667-673; L.C. Pichon, *Perceived skin cancer risk and sunscreen use among African American adults*, in «Journal of Health Psychology», 15 (2010b), pp. 1181-1189.

46 - P. Goon et al., *Skin cancers in skin types IV-VI*, cit..

47 - L.C. Pichon, *Measuring Skin Cancer Risk*, cit.; Agbai et al., *Skin cancer and photoprotection in people of color: a review and recommendations for physicians and the public*, in «Journal of the American Academy of Dermatology», 70 (4/2014), pp. 748-762; Battie et al., *Skin cancer in skin of color: an update on current facts, trends, and misconceptions*, in «Journal of Drugs and Dermatology», 12 (2013), pp. 194-198; Cf. the statistics 2001/2015 in M.B. Culp - N.B. Lunsford, *Melanoma Among Non-Hispanic Black Americans*, in «Preventing Chronic Disease», 16 (2019), e79.

48 - L.C. Pichon, *Measuring Skin Cancer Risk*, cit.

49 - L.C. Pichon, *Measuring Skin Cancer Risk*, cit., p. 176.

Valore[50] highlights here an instance of *epistemic injustice*[51] (specifically of the *hermeneutical kind*) that leads to unequitable access to healthcare for dark-tone-skinned people. This, is argued, is a direct consequence of the value-ladenness of the theory selected as ontological background. By relying on Fitzpatrick's scale, both doctors and dark-tone skinned patients overlook or underestimate skin abnormalities or potential signs of skin cancer, thus delaying the recognition and resulting in late-stage diagnoses, reducing the effectiveness of treatment options and diminishing dark-tone skinned people's chances of survival.

That skin burns and tans is a "well established fact" that is taken for granted in Dermatology. As we have seen, this assumption is the opposite of harmless. In fact, "well-established facts", like the one just presented, often hide biases that are then unintentionally perpetrated. Choosing this ontology over others means to depend on these *problematic* non-epistemic assumptions.

Conclusion

The example case just presented highlights an important point: it is not possible to avoid problematic non-epistemic values in the context of judgement just by pursuing value-neutrality. This is true even if VFI is proposed with the aim to retain public trust in science and foster epistemic democracy[52]. The argument against OCA – and so the one against AIR (Sect. 1.2) – loses its ground as soon as we acknowledge that "well-established facts" are *problematic too*. OCA stands and, therefore, VFI should be rejected.

Every ontological choice brings within itself biases and values that must undergo careful scrutiny. Recognizing that problematic values are part of science, yet on the *ontological choice stage*, does not mean that then *everything goes,* and we should not even try to keep them out. OCA, rather than making the smuggle easier, calls for more *awareness* in the choice of our ontologies and in the

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50 - P. Valore, *Ontological relativity and conceptual analysis as theoretical frameworks for epistemic injustice: Exploring applications*, in «Metaphilosophy», 55 (2024), pp. 264-279.

51 - *Epistemic injustice* is a concept that «describes the systematic exclusion or marginalization of certain groups or individuals from the processes of knowledge creation, dissemination, and recognition, through the imposition of norms and standards that perpetuate power imbalances and privilege certain perspectives over the others» (in P. Valore, *Ontological relativity*..., cit.). Thanks to M. Fricker's, *Epistemic Injustice: Power and the Ethics of Knowing*, Oxford University Press, New York 2007 work we are able to report under this unified category different kind of *epistemic injustice* like, *testimonial injustice*, *hermeneutical injustice*, and *ignorance-based oppression*.

52 - L.K. Bright, *Du Bois' democratic defence of the value-free ideal*, in «Synthese», 195 (2018), pp. 2227-2245.

development of ontological analysis to spot and correct their intrinsic biases. On the contrary, VFI is the one attitude that risks letting problematic value judgements slip unsupervised in scientific practice, precisely because it is based on the false assumption that *value-free* or *epistemic* means *unproblematic*.

In claiming this, OCA is very close to the *new demarcation problem* raised by Holman and Wilholt[53] and Resnick and Elliot[54]: attention should now be turned from debating the VFI to delineating *legitimate* from *illegitimate* influences of values in science. Interesting possibility in this regard – that we will just mention without going into details – is offered by the work conducted by Ratti and Russo[55] and the framework proposed by Ward[56]. In those contributions it is clearly underlined the possibility for values to be *influenced*, *endorsed* and *promoted* by science itself. If we start considering the relationship between values and science not as one-way but as a two-way direction, a lot of new exciting possibilities disclose before us.

Sticking to ontology, for instance, we can imagine a double role of both ontological analysis and correction of eventual biases, on the one hand, and construction of *ad hoc* ontologies that in specific contexts can *endorse* or *promote* specific values[57], on the other. OCA, then, follows the direction drawn by these recent contributions and show how a greater consideration of the ontological dimension could be but beneficial for managing and conceptualizing values in scientific practice.

This approach will necessarily require a multidisciplinary consideration that will allow the inclusion of knowledge fields that are, nowadays, still very far apart. To acknowledge the role of values for science and *vice versa* highlights the need to get rid of the *soft/hard* distinction in order to incorporate diverse practices in the scientific production. It will be then also necessary to discuss the place for ethics and politics in this scenario.

A refusal to proceed in this direction would let problematic values operate freely and undetected, even in situations where we think we are able to reach a sort of *epistemic purity*. This last concept reveals its difficulties when observed through the lens of ontological choice: even the most pragmatic and innocent

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53 - B. Holman - T. Wilholt, *The new demarcation problem*, in «Studies in History and Philosophy of Science», 91 (2022), pp. 211-220.

54 - D.B. Resnick - K.C. Elliot, *Science, Values, and the New Demarcation Problem*, in «Journal for General Philosophy of Science», 54 (2023), pp. 259-286.

55 - E. Ratti - F. Russo, *Science and values: a two-way direction*, in «European Journal for Philosophy of Science», 14 (2024/1), 6.

56 - Z.B. Ward, *On value-laden science*, in «Studies in History and Philosophy of Science Part A», 85 (2021), pp. 54-62.

57 - E. Ratti Emanuele - F. Russo, *Science and values*, cit.

assumption is not exempted by the possibility to be influenced by or produce problematic non-epistemic values. Again, this does not mean we should by any way resort to an *anything goes* policy. The inclusion of multiple discipline in science would precisely work towards the production of diverse practices and approaches to satisfy the need for rigorousness in dealing with different ontologies and values.

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