

# Novel & worthy: Creativity as thick epistemic concept

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## Abstract

The *standard view* in current philosophy of creativity says that being creative has two requirements: being novel and being valuable (to which a third intentionality requirement is often added; Sternberg and Lubart 1999; Boden 2004; Gaut 2010). However, the *standard view* on creativity has recently become an object of critical scrutiny. Bird and Hills (2018) have for instance proposed to remove the value requirement from the definition, as it is not clear that creative objects are necessarily valuable and creative people necessarily praiseworthy. In this paper, I argue against Bird and Hills (2018), since eliminating the element of value from the explanation of creativity hinders the understanding of the role that actual creative objects and ideas play in epistemic practices, which are fundamentally normative. More specifically, I argue that the terms ‘creativity’ and ‘creative’ function as *thick epistemic concepts* when employed by competent epistemic agents in practice, that is, these concepts have both a descriptive and an evaluative content that cannot be disentangled from one another. Accordingly, I suggest that philosophers should prefer *thick accounts* over *thin accounts* of creativity. A thick account of creativity is one that endorses the standard view at its basis, but further develops it in two ways: by stressing the entanglement of the value and novelty requirements; by permitting to encompass a range of domain-specific characterizations of such entanglement for different epistemic situations. In order to take the first step in the development of such a thick account, I look at the domain of scientific practice as a case in point, and try to spell out what the thickness (or entanglement of novelty and worth) of creative instances typically entails here. Namely, I identify the worthy novelty of creative models and methods with their potential to clarify a tradition, with fruitfulness, and with the fulfilment of exploratory aims.

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## 0. Introduction

One of the most widely adopted definitions of creativity in contemporary philosophical debates says that creativity is the ability to produce novel and valuable objects (Boden 2004: 1; Sternberg and Lubart 1999), to which an element of intentionality or agency is often added (Kieran 2004; Stokes 2008; Gaut 2012). Also known as the *standard view* on creativity, this definition appears to capture what is crucial about creativity when we employ the concept in everyday talk. From moments when we praise a child for producing a whimsical drawing, to encounters with artworks that astound us, and to occasions when we celebrate a new scientific invention, we refer to certain objects and ideas that are both novel and valuable as creative. Moreover, the way in which creativity is treated by governing, regulatory, and educational organizations reinforces the idea that creative products are highly valuable. The United Nations “regards creativity as a major component not only of spiritual life, but also of the material and economic life of persons and populations”<sup>2</sup>. The European Commission has developed the programme Creative Europe to provide “conditions for innovation and creativity [...] that can be turned into products and services that create growth and jobs and help address societal changes”.<sup>3</sup> The BIAC of the OECD sustains that creativity is “essential for sustainable growth and economic development”<sup>4</sup>. A similar praise for creativity seems to be ingrained in our accounts of the past. General histories of science and art describe how the greatest individuals of each domain exemplify extraordinary creativity. Einstein, Picasso, da Vinci and Mozart are considered to possess the “gift of creative genius” (Miller 1998), in virtue of which they produced exceptionally novel and valuable works that brought greatness to the societies in which they lived. We could say that the idea of the genius has for very long served as the paradigm of what being creative is about.

Looking at these common assumptions, it is not surprising that we quickly associate creativity with something highly treasured. However, the unconditional appraisal of creativity has recently become an object of critical scrutiny. When so many accomplishments and merits are associated to creativity, we might need to reconsider what we are exactly praising when we praise it, and recalibrate the scope of the achievements that creativity can actually comprise. Some philosophers of art and science have for instance rejected the idea of the creative genius altogether, as it only consolidates a romantic myth around certain individuals who are supposed to possess an innate gift and experience moments of inspiration that cannot be rationally explained. This myth, they argue, hampers the project of

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<sup>2</sup> Resolution 71/284, World Creativity and Innovation Day, UN General Assembly <<http://www.unesco.org/new/en/culture/themes/normative-action/creativity/>>. In 2017 the UNESCO resolved to establish a Creativity Day to “raise awareness of the role of creativity and innovation in problem-solving and, by extension, economic, social and sustainable development”.

<sup>3</sup> Regulation (EU) No 1295/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Creative Europe Programme (2014 to 2020): <<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1295&from=EN>>

<sup>4</sup> BIAC (Business and Industry Advisory Committee to the OECD) “Creativity, Innovation and Economic Growth in the 21<sup>st</sup> century” (2003). <<https://pdfs.semanticscholar.org/1185/c61825f338c9485de8511b40944a70344805.pdf>>

naturalizing creativity or studying it also as part of ordinary cognitive processes in everyday practices (see Kronfeldner 2014; Gaut 2012; Carroll 2010; and Weisberg 1986 for arguments against the myth of the creative genius).<sup>5</sup> Another criticism to the *standard view* on creativity has been recently formulated by Alexander Bird and Alison Hills (2018) with regards to the value requirement in it. These philosophers argue that we should refrain from assuming that being valuable is necessary for being creative. In their article “Against Creativity”, Bird and Hills reject “the unreflective approval of creativity”, which is “both widespread and deeply misguided”, and propose a new definition of creativity in which the element of value is absent except for very exceptional circumstances (2018: 18).

In this paper, I examine the specific arguments that Bird and Hills (2018) offer to reject the *standard view*, and conclude that they are not persuasive enough to convince us to remove the value requirement from our explanations of creativity. With a focus on epistemic contexts, I show that we should keep the element of value in any fruitful explanation of creativity because, as a matter of fact, the terms ‘creativity’ and ‘creative’ function as *thick epistemic concepts* in practice (Williams 1985; Dancy 1995; Putnam 2002; Kirchin 2013). That is to say, these concepts, when employed by competent epistemic agents to qualify certain objects (ideas, acts, etc.), express both an evaluative attitude towards such objects (identifiable with an element of epistemic worth) and a descriptive content (identifiable with an element of novelty), which cannot be disentangled from one another. In other words, creativity attributions assign a ‘novel worth’ or ‘worthy novelty’ to the objects they qualify.

Accordingly, I suggest that philosophers should prefer *thick accounts* over *thin accounts* of creativity. Drawing on recent proposals to advance thicker forms of epistemology (Axtell and Carter 2008; Elgin 2008; Roberts 2018; Poznic 2018), I define a thick account of creativity as one that endorses the *standard view* at its basis, but further develops it in two ways: by stressing the entanglement of the value and novelty requirements; by permitting to encompass a range of domain-specific, narrowed-down, and flexible characterizations of such entanglement for different epistemic situations.

Crucially, the arguments I present here are compatible with a critical attitude towards the myth of the creative genius, the unreflective approval of creative ideas and objects, and the misattribution of unwarranted merits to creative people. In other words, this paper does not aim to extol the value of creativity in general but to spell out the (restricted) sense in which creative instances are epistemically worthy in concrete situations. For instance, I believe that we should refrain from identifying the value of creativity in general with the value of *thin concepts*, which are predominant in traditional epistemology, such as ‘justification’, ‘knowledge’ or ‘true belief’ (Axtell and Carter 2008; Kotzee and Wanderer 2008; Roberts 2018). Creativity, like other thick epistemic concepts, exhibits a *sui generis* form of value, attached to a novelty aspect, that needs to be characterized in its own terms. Taking scientific practices as a case in point, I try to spell out what this *sui generis* value of creativity usually comprises in this domain. In science, I observe, the novel worth of creative models and

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<sup>5</sup> Also numerous historians of science and art have rejected the ideal of the creative genius for different but complementary reasons, that is, this ideal overemphasizes individual achievement against the context of the time and work of others (see Fara 2002; Schaffer 1994). I thank the editors of this topical collection for their input on this, among many other, points throughout the paper.

methods can be typically identified with the clarification of a tradition, fruitfulness, and the fulfilment of exploratory aims.

I start section 1 disputing Bird and Hills's (2018) arguments in favour of a value-free definition of creativity, while acknowledging some important criticisms to the *standard view* they make. Then, in section 2, I propose to understand creativity as a thick epistemic concept, based on how epistemic agents actually make creativity attributions in practice. Lastly, in section 3, I focus on scientific practices, and suggest various ways of spelling out what the epistemic worth of creative models and methods usually comprises here. These final suggestions should be taken as a first step towards the advancement of a more comprehensive thick account of creativity in the future, which would also include an analysis of the value of creative instances in other epistemic situations, as well as aesthetic and everyday contexts.

## 1. Creativity without value: Response to Bird and Hills (2018)

The *standard view* on creativity can be traced back to Kant in the *Critique of Judgment*, where he defines the creative genius as someone who produces works that are “original” and at the same time “exemplary” (1790/2001: 43–50). In recent philosophy of creativity, the *standard view* has been endorsed among others by Sternberg and Lubart (1999: 3), who argue that creativity is “the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)”, and Boden (2004: 1), who argues that it is “an ability to come up with ideas or artefacts that are new, surprising and valuable”. Other philosophers in the debate usually accept the *standard view* as an adequate, although minimal, explanation of creativity, and propose to expand it adding other conditions. Kieran (2014), Gaut (2012), and Stokes (2008) for instance argue that the definition of creativity requires to include some form of intentionality in order to avoid cases of accidental creativity. For Kieran (2014) what is required is “motivation”, for Gaut (2012) “flair”, and for Stokes (2008) “agency”. There are, in addition, ongoing debates about whether the definition of creativity should be principally focused on creative individuals –in which case creativity is understood as a disposition or ability– or on creative objects, creative processes, or even creative groups (Currie 2018; Stokes and Paul 2016; Klausen 2010; Paulus and Coskun 2011).

At the risk of losing scope of these various interrelated debates in the current philosophy of creativity, I would like to discuss one particular attempt to invalidate the *standard view* by philosophers Alexander Bird and Alison Hill (2018). In their article “Against Creativity”, they propose a substantial redefinition of the concept of creativity with respect to the *standard view*, which consists in eliminating the value requirement, keeping the novelty requirement, and adding three further requirements, imagination, fertility, and motivation (Ibid.: 7). Although this section mainly focuses on contesting the first of these moves, I will introduce some brief considerations to how Bird and Hills' proposed role for the imagination can enrich an account of creativity as a disposition of individuals.

Bird and Hills ask themselves the questions: are creative works always valuable?, are creative people unquestionably praiseworthy?, and respond negatively to them. For that reason, they claim, it is necessary to reject the unreflective approval of creativity, and only

acknowledge the connection between being creative and being valuable in very unusual circumstances in which the right conditions are met (2018: 2, 18). Three specific reasons are offered to support this position: 1) it is possible for creative people to manifest their creativity –one and the same disposition– in producing good ideas and bad ideas; 2) it is possible to know that an object has been produced creatively without knowing its value; and 3) creativity can produce objects of wholly negative value (2018: 8). In the following, I argue that none of these reasons is sufficiently convincing.

### 1.1. *Creative people can produce good and bad ideas*

The first argument that Bird and Hills offer to eliminate the value condition from the definition of creativity is introduced with the help of the following example:

William Herschel discovered the planet Uranus and also infrared radiation; yet he also had entirely false ideas about other planets (that the Moon was rather like the English countryside, that the surface of the Sun was cool and inhabited). It is simply not plausible that one set of dispositions (creativity) produced the good ideas of [...] Herschel and quite another generated the bad ones. Distinguishing between their good and bad ideas in term of creativity is neither psychologically realistic nor explanatorily appropriate nor descriptively useful. (Bird and Hills 2018:12)

If being valuable is necessary for being creative, so the argument goes, one would have to postulate that Herschel’s creativity was responsible for the discovery of Uranus and infrared radiation, while another disposition was responsible for the false, worthless claims that Herschel made. This is highly counterintuitive though. We would usually assume that it was the same set of dispositions that allowed Herschel to produce objects of value sometimes, and valueless objects other times. Thus, Bird and Hills argue, we should explain creativity in terms of novelty and the use of the imagination (also motivation and fertility), without introducing a value requirement, so that we can account for the possibility of being creative and nevertheless producing bad ideas.

This argument focuses on creativity as a disposition of individuals. It rightly assumes that not all the ideas produced by an individual, even a historically exemplary scientist like Herschel, were true or good. Indeed, most people would easily accept that scientists and artists have unfortunate ideas sometimes, and this includes philosophers who endorse the *standard view* on creativity as well. This fact, however, does not present any serious challenge for their endorsement of the *standard view*, contrary to what Bird and Hills seem to imply.

I believe that it is possible to contest argument 1) after examining what Bird and Hills mean with producing “good” and “bad” ideas in the quote above. There, they appear to identify a good idea with a true idea and a bad idea with a false idea (2018: 12). Thus, they separate Herschel’s ideas into two groups, one for ideas that are true and therefore valuable, and one for ideas that are false and therefore worthless.<sup>6</sup> This is, however, a way of understanding the value condition in the definition of creativity that we don’t have to endorse.

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<sup>6</sup> In sections 1.2. I refer back to Bird and Hills’s (2018) views on true and false ideas and discuss them more precisely.

Indeed, in everyday talk as well as in specialized epistemic and aesthetic practices, we rarely attribute value to a creative idea in the sense of considering it, qua creative, “valuable as true”, “valuable as good in general” or “value as good *tout court*”. If we think that a good idea can only be valuable in any of these three senses, then I agree with Bird and Hills that “distinguishing between good and bad ideas in term of creativity is [...not] explanatorily appropriate” (2018: 12). What I am suggesting is that an account of creativity does not have to define the value of creativity in any of these ways, because, as a matter of fact, our attributions of value to creative objects and people are much more limited and specific in practice. An account of creativity should, instead, characterize creative products as “valuable-in-a-way” in relation to their novelty, and always dependent on the aims and standards of acceptability of a certain community. As Gaut (2018: 141) has also argued, creative products are never “valuable simpliciter” or “valuable period”, but valuable in a conditional manner that depends on the kinds and contexts to which those products belong.

Thus, a standard view advocate could accept that some ideas are both bad and creative, if with bad one understands that they are neither valuable in general nor substantially true. Yet, a standard view advocate would at the same time sustain that those ideas are valuable-in-a-way that relates to the role of their novelty. To put it in other words, one could unproblematically claim that Herschel’s ideas about Uranus as much as his ideas about the surface of the Moon were creative, and qua creative they were valuable-in-a-way. But this does not imply that one ought to consider all of Herschel’s ideas equally valuable. We may think that his ideas about Uranus were more valuable than his ideas about the surface of the Moon, but just because they were, apart from creative, also more predictively accurate, externally consistent, and observationally rigorous. In section 3, I offer a more specific characterization of what “valuable-in-a-way” usually comprises for the case of creative models and methods in scientific practice.

### *1.2. We can recognize creative objects without knowing their value*

The second argument that Bird and Hills (2018) offer to defend a value-free definition of creativity asks the question: “Do we need to know the value of what has been produced in order to know whether it has been produced creatively?”. To it, they respond negatively as well (Ibid.: 11). The example that Bird and Hills introduce this time are Leonardo da Vinci’s famous sketches of flying machines. They claim that “we do not need to know whether Leonardo’s designs stood any chance of working nor whether if they did they would have been of use to anyone in order to judge that these ideas manifested his creativity” (Ibid.: 12). Although I agree with this claim, it is for different reasons than the ones that Bird and Hills have. While I do not think that there has to be a final working object actually constructed to be able to judge whether da Vinci’s sketches were valuable or not, Bird and Hills fundamentally associate the value of da Vinci’s sketches with their final realizability or truth. For that reason, they claim to be judging da Vinci’s sketches creative “without knowing their value” (Ibid.). On the contrary, I sustain that when we judge da Vinci’s sketches creative we are already ascribing them –and probably the process that gave rise to them– a (limited) value connected to their novelty, whether or not such value translates into a workable device or a set of substantially true statement afterwards.

More specifically, da Vinci's sketches are valuable (qua creative) because they informed and expanded a previous tradition of studies on flight and air resistance. As Galluzi (2020: 103-106) argued, his designs advanced "bold analogies" between the flight of birds and man-powered mechanisms, and served as instruments for visualizing theoretical hypotheses regarding the problem of human aviation. Even if most of da Vinci's theoretical hypotheses on flight were never successfully realized, the sketches advanced understanding of the differences between the power-to-weight ratio in birds and humans (Kemp 2006: 104-106, 249-250). For instance, they helped to see that the quest for aviation could not be based on the imitation of the full dynamism of natural flight, given that the power-to-weight ratio in humans proved this unfeasible, but it could be based, at least partially, on the mechanical imitation of birds' gliding motions in air currents (Ibid.). In fact, Kemp (2006: 249-250) observes that some of da Vinci's wing designs proved to function well in hang-gliding.

Arguably, the hang-gliding case is an exception and for most of da Vinci's sketches there is no evidence of objects constructed after them that demonstrate the truth of his theoretical hypotheses. Still, the sketches should be considered epistemically valuable qua creative because they condense a variety of technical, mathematical, and pictorial resources in novel and stimulating ways that expanded a tradition in the study of human flight and air resistance. Importantly, the fact that the value of creativity in cases like this is not translatable into realizability does not mean accepting "original nonsenses" as possible cases of creativity (see Kant [1790/2001: 43-50], and based on it Gaut [2010: 1039] and Paul and Kaufman [2014] for discussions regarding the idea of "original nonsense"). This is because nonsense is not valuable in any epistemically relevant way, while creative products are valuable-in-a-way. And da Vinci's sketches are far from being nonsense: they are intelligible and build on previous projects to develop mechanical flight.

At some point Bird and Hills (2018) certainly remark that their conception of value is not exclusively identifiable with truth: "of course we acknowledge that a scientific theory may not be true (even approximately) but may nevertheless have some kind of value, contributing in some degree to the progress of science" (Ibid.: 9). They mention "knowledge, understanding, or anything else of scientific value" as possible alternatives to truth in defining the value of creativity (Ibid.: 14). This might appear to locate Bird and Hills' position closer to the idea of "valuable-in-a-way" that I am endorsing here. However, their acknowledgment of epistemic value beyond truth is still very constrained and cannot accommodate the type of characterizations of epistemic worth that I am contemplating here (see sections 2 and 3). This is because, one, Bird and Hills appear to hold a strongly factive conception of what "knowledge, understanding, or anything else of scientific value" are, which is patent in their assessment of the epistemic achievements of Herschel or Ancient Greek science, among other examples they use, exclusively in terms of the true claims they produced (Ibid.). Two, the most explicit way in which Bird and Hills recognize epistemic value beyond truth is by claiming that "discovering why the theory is false may increase our grasp of the subject matter" (Ibid. 9). This is, however, a very narrow way of conceding epistemic merit to scientific theories that are not literally true. It doesn't say anything about the qualities of such theories or how we might learn from them, but only that recognizing their falsity may help us advance in our inquiry by eliminating them. In contrast, I propose to endorse a more flexible conception of epistemic value, as spelt out below, that is able to recognize the worth

of creative instances also when they involve rough approximations, metaphors, or strong idealizations that are not substantially true (Elgin 2008, 2017; Potochnik 2015, 2017).<sup>7</sup>

### 1.3. Creativity can produce objects of wholly negative value

Lastly, argument 3) is, I believe, the strongest reason Bird and Hills (2018) offer to support a value-free definition of creativity. They argue that creative people can produce objects of wholly negative value, as it is shown in cases of ‘malevolent’ or ‘dark creativity’ (Gaut 2010: 1039; also see Cropley et al. 2008; Cropley 2011; Novitz 2003; McLaren 1993). These cases are situations that we recognize as creative, but that concern matters such as committing a crime, murdering, producing torture instruments, or carrying out reprobable actions of various kinds. Cropley (2011) and James and Taylor (2010) have for instance discussed the attacks of 9/11 as a notorious recent case of dark creativity. The example that Bird and Hills introduce is the following:

The zealot of the French Revolution, Jean-Baptiste Carrier, executed his victims in increasingly novel and imaginative ways, including the infamous “Republican Marriage” whereby a male prisoner and a female prisoner would be bound together, naked, and then thrown into the Loire. Creativity can be put to work in doing bad and wrong acts, just as in doing good. [...] So creativity cannot be a disposition to produce objects that have objective value. (Bird and Hills 2018: 8)

Despite our revulsion to Carrier’s method of execution, we would usually acknowledge that he was creative at devising and performing his crimes. Since deplorable actions like this have an openly negative value, to include a (positive) value requirement in the definition of creativity –so the argument goes– has to be mistaken. However, I believe that it is possible to address the challenge of dark creativity also appealing to the idea of “valuable-in-a-way” introduced above.

It would be helpful to start by comparing the term ‘creative’ with others such as ‘intelligent’, ‘precise’, ‘rigorous’, ‘thoughtful’, and ‘elegant’. We typically employ these terms as epistemic or aesthetic values, and sometimes as intellectual virtues too. In philosophy of science for instance, ‘precision’, ‘elegance’ and ‘rigour’ are discussed as important epistemic values for theory choice or model construction (Kuhn 1977; Anderson 2004; Douglas 2013). In aesthetics and art criticism, an artwork that is thought-provoking would be judged ‘intelligent’ or ‘thoughtful’, and artists are praised for their ‘elegance’ or ‘precision’ (see also Turner [2019] and Breitenbach [2020] on the inclusion of aesthetic judgments in scientific practice). Yet, all these terms can have a dark side as well. It is possible to say that “a criminal has been ‘rigorous’ and ‘thoughtful’ in the way he executed his crimes”, that “the murdering was ‘precise’ and ‘intelligent’”, and that a “certain method of execution was ‘elegant’”. The

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<sup>7</sup> Here I am implicitly endorsing the view, defended among others by Elgin (2017) and Potochnik (2015, 2017), that the production of true beliefs is not the most important epistemological endeavour in the domain of science, but, instead, it is the advancement of (non-factive) understanding. Defending this particular view is beyond the scope of this article. At any rate, my aim here is defending a flexible characterization of the value of creativity, for which we do not necessarily need to endorse this particular view, but only recognize that in common epistemic practices –such as those discussed in section 3– competent epistemic agents commonly admit the worth of creative products in terms that are not reducible to (or exclusively identifiable) with truth.



question is whether situations of dark creativity (as well as ‘dark elegance’, ‘dark thoughtfulness’, ‘dark rigour’, etc.) are significant enough to convince us to stop identifying these concepts with values and virtues, and, instead, treat them as valueless or evaluatively neutral concepts to which we might exceptionally attach a positive or a negative valence. I believe that it would be unfortunate, at least from the perspective of a philosophical analysis that is well-grounded in epistemic practices, to do so and take these concepts out of our common stock of values and virtues, given how useful they are in such practices to evaluate the adequacy of certain objects, ideas, or processes. So, even if we admit that cases of dark creativity are a challenge for the *standard view* on creativity, we might lose more explanatory power redefining creativity as a valueless concept –as the key to understanding its typical role is its functioning as a positive value or a virtue– than we would gain from accounting for these exceptional dark cases.

In any case, I do not believe that cases of dark creativity are really a challenge for the *standard view* on creativity. When we admit that a despicable crime was creative, we are, very much to our regret, noting that the crime was novel, and that such novelty has a merit at least in the sense that it allows us to see more clearly a tradition of a certain type of crime, understand patterns in it, and possibly also suggest new effective ways of achieving (despicable) goals. This does not mean that we have to approve the consequences of the criminal acts, nor need we to feel moral esteem for the criminals. But we are conceding some kind of credit to the ability of certain individuals to come up with novel ways of effectively carrying out planned actions in comparison to how they were carried out in the past. In fact, it is difficult to imagine that we would judge crimes that we know were totally ineffective or didn’t trigger any consideration to how previous crimes were committed as cases of dark creativity.<sup>s</sup> Evidence that we are expressing an element of worth when we assign an immoral act the adjective ‘creative’ is that doing so provokes us discomfort, uneasiness, and that we would say that we have to “admit” or “concede” that it was creative. If creativity was a value-free or evaluatively neutral concept, the uneasiness would be unjustified.

At any rate, Bird and Hills (2018: 8) could reply that if the previous argument was right, then calling evil acts creative would “mitigate the harm produced so we can say that the torture was horrific, but at least it was produced creatively”. Contrary to this, “if anything, that very fact makes things worse” (Ibid.). I agree with Bird and Hills that this might be frequently the case. The reason, though, is not that the concept of creativity is value-free and that it indistinctly carries a negative or a positive valence. Calling evil acts creative might make them worse because it outrages us that people’s disposition for creativity, their efforts, abilities, and motivations, are put to the service of morally contemptible goals. But this fact is independent from recognizing that judging some evil acts creative is attributing them a value-in-a-way, that is, a merit which involves a type of novelty that typically affords understanding of similar preceding and future acts. Ultimately, there is a plurality of values,

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<sup>s</sup> Following a suggestion of a reviewer, one might wonder about the existence of creative crimes that we don’t hear or know about that could have been ineffective. This paper is interested in how epistemic agents actually attribute the concept ‘creative’ to certain objects, ideas, and people in their practices. The aim is not to establish an objective measure of creativity that allows us to say whether something that we don’t know about is creative or not, including cases of dark creativity. So unknown and unheard cases of crimes (or anything else we don’t have access to) are not relevant for the discussion here.

epistemic and non-epistemic, usually in trade-off with one another. And creativity is only one among them, as I discuss in more detail in section 3. So even if we attribute a (very specific, restricted) epistemic value to evil acts when we admit that they are creative, we can be attributing them at the same time multiple and stronger negative values of an epistemic, moral, and social kind.

Note that my response to argument 3) is different from other recent ways of addressing the challenge of dark creativity. Novitz (2003: 78) for instance tries to respond to the challenge arguing that cases of dark creativity are not genuine cases of creativity, but cases of “ingenious destruction”. Cropley (2011: 353) argues that cases of dark creativity such as the 9/11 attacks are valuable only in the sense that for a small group of people (i.e. the hijackers) they were noble, useful, and morally commendable acts. And Gaut (2018: 129) argues that creative products are only valuable of their *kind*, and that some kinds may be bad ones (e.g. terrorist acts, torture devices). Although these arguments help elucidate different aspects of the problem of dark creativity, I believe that they fail to fully capture our intuitions about cases of dark creativity such as the attacks of 9/11. Many of us have the feeling that the attacks of 9/11 were indeed creative, not just “ingeniously destructive”, as Novitz (2003) argues, while we feel uneasy recognizing it, that is, while not sharing the views of the perpetrators, which is the explanation that Cropley (2011) offers. Moreover, this uneasiness becomes stronger when we realize that by recognizing the creativity of the 9/11 attacks we are ascribing them a merit that might go beyond the very specific kind ‘terrorist acts’ to which they belong, as Gaut (2018) argues. That is, our attribution of creativity (and therefore of value-in-a-way) to these acts can involve a broader acknowledgement of merit that also reaches kinds such as those concerning the use of tactical skills, organizational abilities, or strategies (even if they would not reach kinds directly involving moral goods or fairness).<sup>9</sup> My response to argument 3) can do a better job at capturing these various intuitions, by basically not denying that there is a limited ascription of value when we call certain instances creative, including cases of dark creativity.

I contended that arguments 1), 2), and 3) are not persuasive enough to convince us to discard the *standard view* on creativity and endorse a value-free definition thereof. Yet, it is important to acknowledge that Bird and Hills (2018) have contributed to the recent debate about the value of creativity in several ways. First, they have brought to the fore the fact that many valuable things in science and art are not the product of creativity, and that more creativity is not necessarily better (Ibid: 17-18). An account of creativity should certainly accommodate this fact, and highlight, as I try to do in section 3 for the case of scientific practices, that things can be epistemically valuable for many different reasons, being their creativity just one among them. Second, Bird and Hills have rightly criticized the vagueness or ambiguity with which the value requirement is often formulated in definitions of creativity. They note that “defenders of the standard view are not always completely clear about the kind of value they have in mind when they say that creativity is a disposition to produce value”

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<sup>9</sup> In any case, disagreeing with Gaut (2018) for locating objects in too narrow kinds in order to respond to the challenge of dark creativity is compatible with endorsing his general claim that the value of creativity ought to be understood always in relation to certain contexts, domains, and historical circumstances, as I further defend in sections 2 and 3.

(Ibid: 8). Indeed, this unhelpful lack of clarity has given rise to the misattribution of unwarranted merits to creative ideas and people, and, I believe, also motivated philosophers like Bird and Hills themselves to reject the *standard view* as it stands. My suggestion, as it will become clearer in the next sections, is that we should, instead of rejecting the *standard view*, address this lack of clarity by further advancing a range of characterizations of the value of creativity for different epistemic situations. Third, Bird and Hills have offered a rich reconceptualization of creativity as largely a matter of the imagination, which I believe can significantly contribute to our explanations of the phenomenon of creativity when understood as a disposition of individuals (perhaps not so directly to explain creativity as a quality of object or ideas) (Ibid.: 2, 18).<sup>10</sup> Thus, I suggest that, in future work, Bird and Hills' proposal is read not necessarily in opposition to the *standard view* but in complementarity to it, in a way that studying the role of the imagination informs the understanding of the distinctive type of value involved in subjects' creativity attributions (see also Gaut 2003).

For now, in section 2, I offer more specific reasons for why it is important to keep the value condition in the definition of creativity, drawing on the idea that creativity is a thick epistemic concept.

## 2. Thick epistemic concepts and creativity

A term expresses a thick concept if it expresses a specific evaluative concept that is also substantially descriptive (Kyle 2013, 2016). Bernard Williams (1985) first introduced the idea of 'thick concept' in metaethics with his book *Ethics and the Limits of Philosophy*. In his own words, a thick concept is both "world-guided" (as it picks out particular properties of the world) and "action-guiding" (as it offers reasons for action or attaches an evaluative flag to the concept) (Williams 1985: 140-1). Paradigmatic examples of thick concepts are 'courage', and 'cruel', while typical thin or purely evaluative concepts are 'good', 'bad', 'wrong', and 'right'. In recent epistemology, there is an increasing interest in discussing whether there are thick epistemic concepts as well, mirroring the debate in metaethics.<sup>11</sup> I believe that looking precisely at these debates on thick concepts in epistemology can inform ongoing discussions in the philosophy of creativity, especially regarding the value of creativity.

### 2.1. Thick concepts in epistemology

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<sup>10</sup> Bird and Hills (2018: 3) define the imagination as the "ability to produce a particular type of mental representation", and attribute it two specific uses in creativity: one, to help "find ways of simultaneously meeting a number of constraints", such as when a poet tries to find the right poetic form at, at the same time, the right words to express an emotion; and two, to "bring together ideas perhaps from what were, until now, different [...] traditions" (Ibid. 17).

<sup>11</sup> A point of controversy here is whether the epistemic is sufficiently like the ethical to conclude that the same distinction between thin and thick holds for the epistemic domain. Roberts (2018) presents strong arguments to defend that they are, and I am assuming the same here.

‘Creative’ and ‘creativity’ are not purely descriptive concepts in the way ‘blue’ or ‘water’ are. They are not purely evaluative concepts either. Observing common uses of these concepts in everyday talk and, more crucially, in specialized epistemic contexts such as scientific practices, should make us recognise them as thick epistemic concepts.<sup>12</sup> Traditionally in epistemology the concepts that have occupied central stage are thin concepts, that is, those that function in a fundamentally evaluative or normative way, such as ‘justification’, ‘warrant’, and ‘knowledge’. However, a growing group of epistemologists contend that thick epistemic concepts might actually be more prevalent than thin concepts in practice. Thus, paying more attention to them would help revivify current philosophical analysis (Kotzee and Wanderer 2008: 342; see also Putnam 2002; Axtell and Carter 2008; Roberts 2018). Paradigmatic examples of thick epistemic concepts include ‘curious’, ‘intellectual humility’, ‘open-mindedness’, and ‘dogmatic’. And other recent attempts to identify thick epistemic concepts can be found in Elgin (2008), who discusses ‘trustworthiness’; Siegel (2008), who discusses ‘education’; Poznic (2018), who discusses ‘scientific representation’; and Alexandrova (2017), who discusses ‘well-being’.<sup>13</sup>

Let us take ‘dogmatic’ as an illustrative example of a term that expresses a thick concept. When we say that “Maria is dogmatic” we are doing two things: describing her as holding strong beliefs, and evaluating her negatively for doing so (Kyle 2016). We could indeed think of situations where holding strong beliefs is not seen in a negative way, for instance when someone has willingness to discuss her beliefs rationally. But this would not be a reason to deny that ‘dogmatic’ is a thick term that entails a negative evaluative stance. In those situations, we just wouldn’t use the term dogmatic. Instead, we would say that Maria is assertive or faithful to her beliefs. Similarly, if we thought that da Vinci’s sketches were completely worthless, we simply wouldn’t call them creative, in the same way we don’t call my doodling in the margin of the page creative. When epistemic agents decide to attribute da Vinci’s drawings the adjective ‘creative’, they are expressing an evaluation in the form of a (limited) attribution of merit, even if this merit does not translate into value in general, value *tout court*, or truth.

Also, one could conceive of situations where the use of the term ‘dogmatic’ could change. For instance, in a historical context where the instability of beliefs in a community is pervasive, the term dogmatic might start to be adopted to praise individuals who are able to commit to their beliefs. Perhaps these conceivable situations are a challenge for someone who wants to establish an undisputable, fixed definition of the term ‘dogmatic’. Whether it is possible to achieve that or not is a semantic point that I will not address here. But what seems certain is that, if the goal is to advance an informative explanation of the phenomenon of dogmatism as we experience it, it is not a good strategy to treat the term ‘dogmatic’ as if it

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<sup>12</sup> I also believe that creativity is a thick *aesthetic* concept, and many of the things I argue in what follows help support this idea too. Other examples of thick aesthetic concepts are ‘gracefulness’, ‘dumpiness’ or ‘elegance’, (see Williams, 1985: 140–145; Kirchin 2013; Zangwill 2001; Bronzon 2009; Kyle 2016). However, I will only discuss thick epistemic concepts in this paper, since the debate on thick aesthetic concepts deals with peculiar difficulties that require separate analysis. I also avoid the problem of how the realms of the aesthetic, the epistemic, and the ethical overlap to an important extent.

<sup>13</sup> More precisely, Alexandrova (2017: 83–4) discusses ‘well-being’ not as an example of “thick concept” but of “mixed claim”. She proposes the expression “mixed claims” in part to avoid the foundational controversies attached to the debate on thick concepts, although acknowledging the closeness between these terminologies.

did not function as a thick concept that typically encompasses a negative evaluation on how certain beliefs are held. In other words, it is doubtful that a value-free definition of ‘dogmatism’ would help us understand our actual experiences with dogmatic ideas and dogmatic people. In a similar vein, if we propose a value-free definition of creativity, we would be overlooking the evaluative content that is most characteristic of our ascriptions of the term to certain people and objects, thus hindering our grasp of the phenomenon it conceptualizes.

A clarification is required here. The discussion about thick concepts might seem so far to be a problem of conceptual analysis, that is, a problem of how to analyse the words ‘creative’ and ‘creativity’ and not about what creativity is. This is not exactly so. Following Elgin (2008: 372), a terminological discussion might be helpful to begin with, but the goal of discussing the particularities of thick terms is not to produce a dictionary with exact definitions, but to elucidate “the constitution of the epistemic realm”, which elements comprise it and how they relate to each other. Traditionally, there were two different things we could do with language: evaluate and describe (Roberts 2018: 162). If thick concepts can do the two things at the same time, and we conclude that concepts like ‘curiosity’, ‘trustworthiness’ and ‘creativity’ are thick and play important roles in our epistemic practices, we would have to reassess how our epistemic realm is constituted according to this.

## 2.2. *Entanglement*

A fundamental feature of thick concepts (both ethical and epistemic) is the tied connection between their descriptive and evaluative components (Roberts 2013; Kotzee and Wanderer 2008). The disentangling argument was formulated by McDowell (1998) precisely to expose the difficulties of separating these components, or the irreducible thickness of thick concepts. In other words, we should not be thinking of thick concepts as having an original descriptive content, to which an evaluative stance (such as those expressed by thin concepts) is just added to it (Poznic 2018: 3435).<sup>14</sup> The implication this has for the debate of creativity is that the evaluative component of the concept of creativity (that is, what I identified so far the “value requirement” in the definition of creativity) cannot be understood as detached or disconnected from its descriptive component (identifiable with the “novelty requirement”). Recognizing the creativity of Herschel’s ideas about Uranus or about the surface of the Moon is assigning them a value attached to the novelty that such ideas exhibited. The value is not an extra aspect added to it, but is built into the meaning of the term ‘creative’ when attributed to Herschel’s ideas.

To see the difference between a definition of creativity that takes it as an (irreducibly) thick concept and one that allows a factor analysis of its components, it is helpful to consider Elgin’s (2008: 372) newly coined predicate ‘gred’. ‘Gred’ applies to all and only things that are good and red, so it is both a descriptive and an evaluative concept. A gred mitten, for

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<sup>14</sup> There are actually different views on this point in the debate about thick concepts. For some philosophers it is possible to grasp what thick concepts mean even if we analytically separate their descriptive and evaluative components, because these components are connected only in a pragmatic way (Väyrynen 2013). Meanwhile, for other philosophers, especially non-reductivists, thick concepts conceptually entail evaluative content, so it is not possible to grasp their meaning separating the evaluative and descriptive components (Williams 1985; Dancy 1995; Roberts 2018; see Roberts 2013: 677-8). My proposal is closer to the latter group but any of these positions can help sustain the arguments on the thickness of creativity presented here.

instance, satisfies the descriptive requirement (by being red) and the evaluative requirement (by being good at warming my hand). However, “a red item’s being red has no bearing on its being good; nor has its being good any bearing on its being red. It is simply a contraction” (Ibid.). Thick epistemic concepts are not mere contractions, because without them we wouldn’t be able to partition the world as we do now, marking out extensions –such as the extension of creative objects– that the mere sum of thin concepts (like good) and purely descriptive ones (like red) wouldn’t be able to mark out (Ibid.: 375). We could say that thick concepts express a *sui generis* evaluation, that is, an evaluation that picks out particular features of the world, and is not replaceable by the sum of a thin concept and a description (Kyle 2016; Williams 1985). Advocates of thicker forms of epistemology contend that the *sui generis* evaluation expressed by concepts like ‘trustworthy’ and –I argue– ‘creative’ might be prior and more fundamental than the evaluation expressed by thin concepts like ‘knowledge’, in the sense that the former are necessary to grasp “what makes knowledge worth having” in the first place (Elgin 2008: 387; see also Kotzee and Wanderer 2008: 342; Roberts 2018: 164; Fricker 2007).

There is an additional reason to support the idea that the evaluative and descriptive components of creativity are entangled. Namely, attempts to explain the supposedly mere descriptive part of creativity (i.e. its aspect of novelty<sup>15</sup>) cannot help but introduce positive value judgments. For instance, Kronfeldner (2014) argues that she “shall concentrate on novelty” in her analysis of creativity, without dealing with the issue of value (2014: 578). But then, in order to clarify in what sense something must be novel in order to be creative, Kronfeldner refers to ‘originality’ and ‘spontaneity’, understood as adequate degrees of independence from a tradition and previous learning (Ibid.: 584). This characterization suggests a positive stance on the kind of ‘newness’ that creativity is about. Actually, the more evaluatively neutral term to be used here would have been ‘newness’, but it is rarely employed to define creativity, probably given its evaluative unspecificity. When we describe something new as ‘novel’ and ‘original’, we already attribute some type of worth to it. We are saying that such newness is neither a conventional one –like a product that is new but predictable or repetitive– nor a negative one –like a product that is new but unorthodox in an undesirable or irrelevant way. In fact, ‘novelty’ and ‘originality’ could be considered thick concepts as well, with a positive evaluative flag attached to them.<sup>16</sup>

Another example of the filtration of positive value judgments in the characterization of the descriptive content of creativity can be found in Kieran (2014). Kieran discusses motivation,<sup>17</sup> one of the requirements for creativity in his view, which is in principle separate

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<sup>15</sup> Also its aspects of imagination and motivation would be part of this descriptive content of creativity as well, in case we develop an expanded version of the *standard view* focused on creativity as a disposition of individuals (see Bird and Hills [2018], Kieran [2014], and Gaut [2012]).

<sup>16</sup> For the case of ‘spontaneity’, which Kronfeldner (2014: 588–9) also introduces to describe the kind of newness that creativity is about, I concede that this might not be a thick concept but a descriptive one. Still, philosophers like Gaut (2018) take spontaneity as encompassing an element of positive value too: “Since we value spontaneity, and creativity involves an element of spontaneity, part of the explanation for the final value of creativity lies in its dimension of spontaneity” (Ibid.: 140–1).

<sup>17</sup> More specifically, Kieran (2014) discusses “internal or intrinsic motivation”. He also considers “external motivations”, such as commercial gain or celebrity status, but attributes only to internal motivations the role of making creativity a virtue of character.

from the value requirement. But then, he defines motivation as an “acting out of a desire to realize what makes something valuable [...], expressive, imaginative, or beautiful” (Ibid.: 129), and considers the motivation of a creative person “itself a praiseworthy achievement of character” (Ibid.: 132). So in Kieran’s (2014) account, creative agents direct their motivation into the production of epistemically or aesthetically commendable objects. Here, the value of creativity is not only involved in its corresponding requirement (of value), but is strongly present in the characterization of the descriptive content of creativity, namely, it is ingrained in the motivation requirement.

In accordance with the arguments above, I suggest that philosophers should openly recognize the irreducible thickness of the concept of creativity, and advance *thick accounts*, instead of *thin accounts*, thereof.<sup>18</sup> A *thick account* of creativity is one that builds on the same intuitions which underlie the *standard view*, as it recognizes at its basis both an element of novelty and an element of value. But it goes beyond the *standard view* because it stresses the entanglement between these two elements, and tries to spell out, by narrowing down as much as possible, what such entanglement comprises for specific epistemic contexts. Meanwhile, a *thin account* of creativity would be one that only acknowledges the descriptive content of the concept (i.e. Bird and Hills 2018), or acknowledges both but examines them separately (Kronfeldner 2014, Kieran 2014). I believe that this latter group of thin accounts would have benefited from taking a thick turn and acknowledging the entanglement between the two contents of creativity instead of factorizing them. For instance, Kronfeldner (2014) could have advanced further insight on why originality and spontaneity are the adequate kinds of novelty that creativity requires, by referring to the ascribed value that we, as competent epistemic agents, concede to certain forms of newness (namely, those that expand our tradition and permit progress) and not to others. And Kieran (2014) could have further vindicated the importance of subjects’ internal motivations by bringing in the role played by evaluative attitudes and shared value judgments in directing subjects’ creative work.

Developing a thick account of creativity requires to adopt both a flexible and a domain-specific conception of epistemic value. A flexible characterization of epistemic value is one that may recognize the importance of generating new justifications or true beliefs, but also contemplates a plurality of other ways in which things can be epistemically worthy without being substantially true, or in addition to being true (Elgin 2017; Potochnik 2017). This idea is in line with numerous accounts in recent philosophy of science that highlight the existence of a plurality of values in trade-off with one another in practice, as I spell out in section 3 (Kuhn 1977; Anderson 2004; Parker 2010; Douglas 2013). Apart from flexible, the characterization of the epistemic value of creativity should be domain-specific and narrowed-down to particular situations. This is because a “mere value condition” in the definition of creativity is just uninformative (Stokes and Paul: 2016: 3n), and a thick account should aim to bring clarity to how creative instances are “valuable-in-a-way” in different contexts. In the

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<sup>18</sup> The idea of a *thick account* of creativity builds on Poznic (2018), who distinguishes between *thick* and *thin accounts* of ‘scientific representation’; Currie (2018), who argues that we need *thick descriptions* of epistemic situations, precisely in the context of discussing the role of creativity in science; and Alexandrova (2017), who highlights the importance of “mixed claims” in scientific practice, that is, claims that incorporate both an empirical hypothesis and a value judgment.

next section, I take the first step towards the advancement of a –hopefully in the future more comprehensive– thick account of creativity, focusing on scientific practices as a case in point.

### 3. Creativity and the plurality of values in science

I have thus far argued that creativity, as a thick epistemic concept, includes value in its content. But how should we capture this value, entangled with an element of novelty, in actual epistemic contexts? The aim of this section is to characterize, by narrowing down, such entanglement in a paradigmatic epistemic domain, namely scientific practices.<sup>19</sup>

#### 3.1. *Worth of creativity in science*

Without aiming to exhaust the task of spelling out the epistemic value of creativity for any possible situation in scientific practices, I offer a flexible characterization consisting in three typical ways in which creative models and methods are epistemically worthy (*qua* creative). Namely, I identify the value of creative instances in science with their ability to clarify a tradition, with fruitfulness, and with the fulfilment of exploratory aims.

Drawing on Carroll (2010), one could claim that there is a minimal sense in which creative instances are valuable, and then stronger ways in which they might be so as well. The minimal sense concerns the capacity of such instances to clarify the tradition in which they are embedded (Ibid.: 70-71). Although Carroll (2010) was mainly trying to characterize the value of creativity in the arts, I take this to be also a minimal, common denominator of epistemic value shared by creative instances in science. In this minimal sense, a creative scientific model, theory, or method would be epistemically worthy insofar as it shows us “the tradition and its possibilities more clearly, expansively, and perspicuously than earlier works” (Ibid.). This is because creative objects “recombined elements and concerns of the tradition in an especially deft, original, or insightful way”, making our previous commitments manifest in a way that was not so patent before (Ibid.). It might be the case that some creative models and methods end up being impractical or inadequate for the scientific community that produced them, and eventually abandoned. Still, *qua* creative, they were epistemically valuable at least in the sense that their novelty brought some commitments of the tradition to the fore, allowing qualified epistemic agents to better discuss, understand, revise, and challenge such tradition. And this, in turn, frequently increases the possibilities of an inquiry to correct itself and move forward.

A good example of a creative scientific model whose epistemic value (entangled with novelty) can be spelt out in terms of the clarification of a tradition is the MONIAC or Phillip’s

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<sup>19</sup> In this section I frequently refer to the “value of creativity” or “creativity as an epistemic value” plainly, without explicitly reiterating each time that such value is a value-in-a-way attached to an element of novelty. After the disentangling arguments presented earlier, it should be clear at this point that referring to the value of creativity is equivalent to referring to the “novel worth”, “worthy novelty”, “value-in-a-way”, “thickness”, or “*sui generis* evaluation” of creativity.



hydraulic machine from 1949 (Vines 2000; Morgan 2012; Frigg and Nguyen 2017). Phillip's machine is a model formed by a system of tanks, valves and pipes through which water flows, and that aimed at representing the dynamics of market demands in an economy. In a stagnant moment of inquiry, in which resources to reason about policy intervention on an economy seemed insufficient to make the field move forward, producing a creative model like this was particularly desirable (Vines 2000). The MONIAC exposed important commitments and resources used to represent economic systems in the past, making them now "immensely visible" (Ibid.: 58). It allowed scientists to reason about money transactions "vividly" for the first time, while looking at water tanks rise, and to ask questions about policy in a very material manner, while operating valves and pumps manually (Ibid.: 46-49). A creative model like Phillip's machine was epistemically worthy (qua creative) to the extent that its novelty helped to expose traditional assumptions in economics, and stimulated questions about how to better exploit representational resources in future practices.

Indeed, the epistemic worth of Phillips' machine qua creative did not entail that the model was prolific or successful in a stronger sense. The MONIAC did not for instance impose a new form of modelling the dynamics of market demands in the field, as hydraulic models (or physical analogical models more broadly) would continue to be very scarce in economic research afterwards. In some cases though, allowing to clarify a tradition of past theories, methods, and representational resources through creative models proves to be highly fruitful, the key to make a whole field emerge or evolve. Fruitfulness is therefore a way of spelling out the value of creativity in scientific contexts that sometimes complements the minimal sense (see Kuhn 1977; McMullin 1976, 1979; Nolan 1999; and Ivani 2019, for discussions on the value of fruitfulness in science; and Šešelja and Straßer 2013, and Nyrup 2018, on related issues on pursuitworthiness). If we look at other cases, such as R. A. Fisher's work in population genetics in the 1930s, we would say that his ideas were creative both in the sense that their novelty allowed to clarify a tradition, and that such clarification was highly fruitful (see Fisher 1930). Fisher's work made manifest the latent explanatory possibilities of the –previously proposed– Darwinian theory of natural selection and Mendelian inheritance principles, which he combined using novel mathematical models. This allowed to eventually open a whole new field of investigation that would be key in 20th century biology, namely modern synthesis. Here the revision of the tradition not only offered a better understanding of it, but was "bountiful— its consequences have been both copious and beneficial for the practice to which it belongs" (Carroll 2010: 70).

Of course being bountiful or fruitful can only be calculated retrospectively, after having observed the branching lines of development that a certain work motivated (Carroll 2010: 70; see also Schaffer 1994). But, before we can observe that, creativity can function as an important epistemic value that helps regulate ongoing scientific practices, together with other values (epistemic and non-epistemic) that it might be in combination or trade-off with (see). When scientists judge that in their current work a certain model is creative, they are recognizing that the model brings to the fore some assumptions of the tradition, allowing to see patterns in it, and perhaps also that the model is appropriate for carrying out certain epistemic tasks. Exploration, I argue, is the most obvious of these tasks. Exploratory modelling and exploratory experimentation are important part of the scientific enterprise. They aim at getting a grasp of natural phenomena in the absence of a well-established theory, and in occasions in the absence of even a well-delineated target system (Gelfert 2018: 222-

224; see also Steinle [1997], Burian [1997], Elliott [2007], and McLeod and Nersessian [2013] on exploratory experimentation; and Boden 2004 on “exploratory creativity”). Philosophers of science have generally paid more attention to scientific models that have explanatory or predictive potential, and only occasionally analysed the particularities of exploratory models (Gelfert 2018: 230). This has stressed the importance of epistemic values such as observational accuracy, precision, and external consistency in their analyses. Meanwhile, in exploratory research, creativity becomes a particularly appreciated epistemic value.

A recent example of exploratory astronomical science illustrates this. In April 2019 the first image of a supermassive black hole situated at the centre of the M87 galaxy was publicly released.<sup>20</sup> The achievement resulted from the work of the Event Horizon Telescope (EHT), an international team that developed a creative methodology consisting in the synchronization of large amounts of data collected at eight ground-based telescopes located at different points of the Earth. Allegedly, when all those data were synchronized, with the help of atomic clocks, complex imaging algorithms, and after filling in numerous gaps of information, a planet-sized telescope, able to produce an image of a black hole, was virtually created. This method, which involves the coordinated use of different telescopes, can be considered highly creative –and as such epistemically valuable– because it is bringing clarity to our tradition of observational and imaging methods in astronomy, by allowing to see previously unseen possibilities in the study of distant astronomical objects with telescopes that have a limited resolution capacity. Moreover, the EHT, in virtue of its creative character, is especially suitable to carry out exploratory tasks: it is proving helpful to delineate more sharply targets that are still largely unknown such as black holes, and suggest new ways of testing Einstein’s theoretical claims about black holes. We are yet unable to say whether this method will be prolific in the coming years. But we can certainly agree that it is a creative methodology that issues a promissory note about its potential fruitfulness (Carroll 2010: 71).

### 3.2. *Plurality of epistemic values in science*

In an attempt to offer a narrowed-down and flexible characterization of the epistemic value of creativity in scientific practice, I associated such value with its potential to clarify a tradition, frequently suggesting fruitful ways of improving it, and sometimes also helping fulfil exploratory aims. However, there is a plurality of epistemic values at play in scientific practices (Brown 2012; Douglas 2013; Potochnik 2015; Parker 2020). So it might be the case that a creative model is not the most desirable type of model in certain epistemic circumstances, and that a creative methodology is not the most appropriate methodology with regards to certain goals. Instead, we might want to prioritize values like precision, external consistency, observational accuracy, scope, simplicity, or a combined balance of some of these when the circumstances demand so. On this point, I certainly agree with Bird and Hills (2018: 14) that “if creativity is in part responsible for the success of modern science, that

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<sup>20</sup> Press Release Event Horizon Telescope (April 10, 2019): Astronomers Capture First Image of a Black Hole. <https://eventhorizontelescope.org/press-release-april-10-2019-astronomers-capture-first-image-black-hole>. For full articles with results, telescope methodology, and imaging process see: The Event Horizon Telescope Collaboration et al (2019) L1, L2, L3, L4, L5 and L6.

is only because it is being used in a particular context”, and not in contexts where it is not mostly required. For instance, if the purpose of a certain practice is to produce a copy or duplicate of an original (e.g. an experiment), creativity might not be necessary at all, or not in a substantial way (Ibid.: 15).

Recognizing creativity as an epistemic value (with a descriptive content associated to novelty) does not mean ascribing creative models or methods a total worth. In fact, scientific models are only valuable to very specific respects (epistemically, socially, ethically), and even to each of these respects, only in very concrete ways. For this reason, philosophers like Parker (2010, 2020) have argued that to talk about the mere adequacy of a scientific model is rather ambiguous, insofar as the good performance of the model in the past (or regarding certain epistemic aims) does not guarantee its good performance in the future (or regarding other epistemic aims). Instead, we should always think in terms of “adequacy-for-purpose” (Parker 2020: 457; see also Poznic 2018; Potochnik 2015; Douglas 2013).

Now, in concrete epistemic contexts, what scientists might need the most is to make a research program move forward, break with a cognitively stagnant situation, or escape from an epistemic inertia that blocks the study of potentially fertile paths of investigation. Creativity becomes an important epistemic value precisely in these contexts. Bird and Hills (2018: 17-8) would agree with this point too, as they accept the importance of creativity in breaking with a tradition that proves to have reached its limits. However, while they think that these situations are very unusual and that creativity is not relevant in the majority of cases, I believe that situations where a tradition has reached its limit might actually require *exceptional* creativity, yet (more moderate) forms of creativity are a desirable value in numerous other scientific situations, such as those described above. Science needs to be “well-adapted”, that is, different epistemic situations require different research strategies, and creative models and methods are particularly desirable when exploration and hot-searches are needed (Currie 2018). The case of the EHT method in astronomical research showed this. A less creative method in this case would have been one that for instance tries to improve individual telescopes, augmenting the angular resolution or sensitivity of each of them. This would have perhaps allowed to make slightly more rigorous observations of black holes, without the important gaps of information that the EHT method entails. However, this less creative method would have not been suitable to carry out the bolder exploratory searches that constructing an overall image of black holes demands.

Recognizing the plurality of epistemic (and non-epistemic) values and aims, and the possible trade-offs between them, is fundamental to understanding the specific sense in which creative products are valuable. I largely agree with Bird and Hills (2018: 18) in their criticism to the “unreflective approval of creativity”. But, differently to them, I have proposed to amend such fault with more domain-specific and flexible characterizations of the value of creativity. The suggestions in this section, though, are only a partial attempt to spell out the value of creativity in scientific modelling practices, and do not aim to be sufficient to advance an exhaustive *thick account* of creativity. In order to build such an account, these suggestions would need to be further developed, adjusted, and complemented with other analyses of creative instances in different epistemic, as well as aesthetic and everyday contexts.

## 4. Conclusions

Explaining creativity in a way that is both informative and compatible with our intuitions as speakers embedded in epistemic practices requires to advance *thick accounts* of creativity. A *thick account* is one that acknowledges that when we employ the concept of creativity we are expressing both a description and an evaluation. While the description largely involves an element of novelty –and possibly also motivation and imagination when we are treating creativity as a disposition of individuals–, the evaluation entails an element of epistemic worth or merit.

Thus stated, it can seem that a thick account of creativity is equivalent to what the *standard view* already said, namely, that being creative has two requirements: being novel and being valuable. However, I made an important appreciation. A thick account emphasizes the entanglement between the novelty and the value aspects of creativity, while philosophers who endorse versions of the *standard view* frequently examine these aspects as separate requirements that are just juxtaposed (Kronfeldner 2014; Kieran 2014). The distinction is important because a mere value requirement is uninformative if not attached to the genuine type of novelty that creative products exhibit. And vice versa: the genuine novelty of creative products is only understandable if linked to its epistemic worth.

The key to develop a comprehensive thick account of creativity is to spell out as much as possible what the “novel worth” or “worthy novelty” of creative instances usually comprises in concrete epistemic situations. My final proposal consisted in suggesting three possible characterizations of the novel worth of creativity for the case of scientific practices. Namely, I identified the value of creative models and methods (qua creative) with their potential to clarify a tradition, with fruitfulness, and with the fulfilment of exploratory aims. Moreover, I stressed that there is a plurality of epistemic and non-epistemic values in scientific practices, usually in trade-off with one another, and that creativity is only one among of them that would be prioritized only in specific circumstances. This proposal should be taken as a step forward in the project of advancing a richer and more encompassing *thick account* of creativity in the future, which would ideally contribute to elucidate the normative role of creative products also in other epistemic and aesthetic situations.

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