

Against Creativity

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Abstract

Creativity is widely seen as an entirely praiseworthy trait, even as a virtue. We argue, however, that creativity is not essentially a disposition to produce valuable objects. Creativity has instrumental value at most, and then only in the right circumstances. We consider the role of tradition and judgment in worthwhile creativity and argue that there is frequently a tension between creativity and the production of value.

1 Introduction

Creativity is almost universally praised and valued. Some go so far as to say that creativity is a virtue (Zagzebski 1996: 167; Kieran 2014). Others define creativity in terms of value. Among philosophers and psychologists, value is widely regarded as essential to creativity alongside the originality of the ideas produced: “Creativity is the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful, adaptive concerning task constraints)” (Sternberg and Lubart 1999: 3). “What is it to be a creative person? There is a minimal sense according to which it just is to possess the ability to produce novel and worthwhile artefacts” (Kieran 2014).

We focus here on the definition of creativity as a trait of persons.¹The standard view, defines *creativity* as a trait characterized by the disposition or set of dispositions of an individual

1. To have novel ideas (*originality*)
2. Which are valuable; or produce objects which are valuable (*value*)

¹ One does also call acts, processes, and products ‘creative’. In our view these are the manifestations of the trait of creativity. An object may be novel and even valuable, but if it was not produced by a person’s creativity (e.g., in our view was not the product of their imagination), but was the result of mere accident, then it is not a creative product.

Even those who do not define creativity in terms of value may nonetheless think that creativity is to be valued because it is instrumentally valuable, tending in fact to produce objects of value (e.g. beautiful works of art, true theories).

Our primary aim is to challenge the value accorded to creativity. We therefore first tackle the claim that creativity is valuable because it is essential to creativity that it is disposed to produce objects of value. We reject this claim in Section 3—creativity can produce objects without value of any kind. In Section 4 we examine the widely cited “original nonsense” argument for value in the definition of creativity (attributed to Kant) and find it unsound. We then move on, in Section 5, to the weaker reason for valuing creativity: even if creativity is not essentially directed towards producing objects of value, it nonetheless is highly conducive towards their production. From this point on, we restrict our attention to creativity in the arts and sciences, since the target claim looks more plausible with that restriction than without it. Even so, we find the contingent and instrumental value of creativity to be limited and constrained. We accept that creativity may raise the chances of value, though we note that the argument is not trivial. On the contrary, the argument reveals that in order for creativity to lead to value it typically need to operate in conjunction with good judgment and a propitious tradition of work that is itself conducive to the production of valuable objects.

We reject the standard view and aim to replace it with an improved definition of creativity. It rejects value but retains originality.³ To originality we add three related conditions not normally found in definitions of creativity, the most significant of which is imagination. Creativity, in our view, is the disposition or set of linked dispositions of an individual:

1. To have novel ideas (*originality*)
2. Which are generated through use of the imagination (*imagination*)
3. And are many and varied (*fertility*),
4. And to carry through these ideas to completion (*motivation*).

³ One might wonder whether novelty really is essential to creativity. Ruby Meager (1958) remarks of creativity that ‘In the whole history of aesthetic appreciation this might appear as a local and temporary, rather than universal and essential, demand’. However, in our view, creativity does at least require that a creative individual have ideas that are not the same as those she has had in the past, and in at least that sense novelty is essential to creativity.

As is implicit in this characterisation, these four component elements work together in a creative individual (an individual cannot be thought of as properly creative who sometimes has imaginative new ideas but when she does so is not motivated to work on them and when she feels motivated, cannot have the ideas). Creative acts and products are the manifestations of these dispositions. We do not depend on the correctness of our view in rejecting the standard view (that would beg the question). It is nonetheless useful to have a plausible foil to the standard view. It will also help us see that creativity is often in fact in tension with the aim of producing value.

2 A new definition of creativity: a role for imagination

According to the standard definition, creativity is a disposition to produce new and valuable ideas or objects. But not all ways of producing novel, valuable ideas are creative. For instance, it may be possible to produce such ideas by a random process; or by a purely mechanical process, such as following a simple rule. But these are **not** typically exercises of creativity.

Perhaps it might be said that anyone using a random process or mechanically following a rule is unlikely to be *disposed* to produce new and valuable ideas: one might do so occasionally, as a mere accident. But it is possible to be disposed to produce new and valuable objects, without exercising creativity. Matthew Kieran (2014: 126–7) imagines a stroke victim who tries very hard but unsuccessfully to write. In the attempt he produces beautiful abstract patterns. So the stroke victim meets the standard definition of creativity—he is disposed to produce new and valuable objects. But he is not thereby creative. This shows that the standard view is mistaken: disposition to produce novel, valuable objects is not sufficient for

creativity. The missing ingredient is the imagination. In our view, this person, in this respect, is not creative, since the abstract patterns are not the products of his imagination.⁵ of creativity.

Perhaps what the stroke victim lacks is not imagination but the intention to produce the patterns. However, one can intentionally produce new and valuable works without exercising creativity. Consider someone who is painting by numbers but errs in following the wrong rule for applying the colours. The result may thereby be novel and even beautiful; it was intentionally produced. But it was not the exercise of creativity.

The imagination is the cognitive source of genuine creativity. What is the imagination? It is the ability to produce a particular type of mental representation, but it is widely considered to have very different forms and its nature is the subject of significant dispute.⁶ As far as possible, we are liberal about the kinds of imagination that may play a role in creativity. For instance, the imagination may produce novel ideas deliberately (as when a scientist spends a great deal of time trying to develop a theory; or a writer edits and rewrites her work). The imagination may also generate ideas spontaneously (as when a scientist is suddenly struck by a hypothesis, or a writer by a novel image).⁷ For example, Darwin tell us in his *Autobiography* that he was struck on re-reading Malthus's *Essay on Population* that it contained the missing principle he needed to explain evolution. Insofar as this was not obvious to just anyone, Darwin's creative act involved being able to imagine his theory enhanced by the addition new principle.⁸ The creative use of imagination may be

⁵ Kieran (2014: 126) himself says that the stroke victim is creative in a minimal sense. But he clearly also recognizes some inadequacy in this, since he uses the case to motivate a richer sense of creativity that he goes on to develop.

⁶ It might be possible to drop the reference to *mental* representations. Some argue for the possibility of creativity in computers, in which case the representations are not mental (see, e.g., McCormack and d'Inverno 2012). We do not take a view on this, but do note that typical approaches to computational creativity follow the pattern we attribute to human creativity: the generation of ideas from a space of possibilities, followed by a process of evaluation.

⁷ Walton (1990) distinguishes the spontaneous and deliberate use of the imagination.

⁸ We owe this example to Berys Gaut.

accompanied by mental imagery (as when an artist mentally pictures the artwork she is about to produce, or a composer hears a tune running through her head); but it need not be.

In our view the imagination is the ability to scan, consciously or unconsciously, some subset of the space of relevant possibilities. In short it is the ability to see possibilities.⁹ There are many ways that this might be carried out; here we mention two that we take to be particularly significant in creativity. First, an individual may set herself a problem that needs to be solved by satisfying a number of different constraints or desiderata; it may not be obvious that they can all be satisfied simultaneously, or, if they can, which way of doing so is the best. A more imaginative individual will be able to find an option that meets all of her constraints, in the first case; and a larger number of options (than a less imaginative individual would find) in the second, which are then available for evaluation and selection. Secondly, an individual may produce original works of art or scientific works by combining existing ideas together in novel ways, for example, by finding an analogy between existing successful works and the present task.¹⁰ And of course these two processes are often combined, when a series of constraints are met by the adaptation of one or more existing ideas.

The same sorts of imaginative process play a role in scientific and artistic creativity. Consider, for instance, Kuhn's idea that scientific research is governed by a *paradigm*, a set of related exemplary scientific achievements, which sets the agenda for future research (Kuhn 1970: 187). The paradigm enables scientists to conceive of the world in a particular way, as

⁹ The relationship between imagination and possibility is very contentious. As far as possible we do not take a stand on this. It is likely that the relevant sense of possibility here is epistemic (see below). Note that in this context the object of the imagination is the artwork or theory etc. The creator is imagining how a poem would work with a certain metaphor, what consequences a hypothesis might have with a new assumption. This means that the writer of fiction is imagining what her story would be like with a certain development. So it is not an objection to this account that the story might be about something the writer knows to be impossible, for example someone travelling faster than light. The imagined story as an artwork is possible even if its content is not. (How in fact we imagine things we know to be impossible is another, albeit important, question.)

¹⁰ Currie and Ravenscroft (2002) call this *creative imagination*; but we take it that this is only one form that creativity can take.

conforming to the key theories of the paradigm: the scientist learns to see one thing as like (or as unlike) another. For example, an Aristotelian thinker would see the motion of the Moon around the Earth as something completely different from the motion of a projectile or falling object, whereas the Newtonian thinker sees these as variant manifestations of fundamentally the same kind of motion. Consequently certain scientific problems are seen as similar to one another and so calling for similar solutions—in particular they are seen as similar to the founding problems and solutions, the paradigm problems/exemplars. In some cases the parallelism is straightforward. Book 3 of Newton's *Principia* applies the general laws and theorems concerning motion and gravity that are proved in Book 1 to the astronomical phenomena of the Solar System, for example estimating the ratios of the masses of the Sun and major planets, accounting for the observed motions of the planets and comets, and such like. Newton, however, did not solve all such problems: various puzzles concerning the motion of the Moon defied solution until Alexis Clairaut's *Théorie de la lune* showed how they could be accounted for within the Newtonian system. The problems Clairaut solved are of the same type as those Newton had already tackled and the solutions were likewise of the same kind, differing principally in their greater mathematical sophistication.

In Clairaut's work, the problems and the physical principles behind their solution are obtained by straightforward analogy with Newton's problems and solutions to those problems (even if working out the mathematical details of the solution was far from trivial). In other cases the analogy is less direct. In the 1780s researchers were interested in the forces of attraction and repulsion among charged bodies. Several devised experiments to generate data from which they could infer a suitable formula. Coulomb saw the problem as analogous to Newton's problem of gravitation, both being problems of finding the forces between bodies with certain properties, and so proposed an analogous solution, an inverse square law, even though the analogy is not exact (the sign of the force is the opposite, and Coulomb has to accommodate positive and negative charge whereas Newtonian mass is always positive). Coulomb also devised a instrument for measuring electrostatic forces that is an analogue of Cavendish's torsion balance, except that whereas the latter is several meters across in size, Coulomb's balance is smaller than a dinner plate.

The proposal is, then, that a scientist chooses her problems in large part on the basis of their similarity or analogy to existing problems. And she searches for possible solutions by considering analogues of solutions to existing problems.¹¹ So while imagination is the ability to search through a space of possibilities, what enables the imagination to do this well (to light upon possibilities that have some chance of having value) is that it works within a tradition. The tradition of problem-solving both constrains and guides the imagination's search through possibility space.

Can the imaginative component of creativity in the arts be understood in a similar way, as searching the space of possibilities by looking for analogies, connecting possibilities to prior models and exemplars, given by a tradition? Carroll (2003: 217) emphasizes the importance of tradition for creativity:

Tradition . . . is indispensable for creativity . . . , because it serves to fix the horizon of possibilities that lie before the artist. It focuses the artist's attention upon those options that will be intelligible—to the artist and her audience—against the historical background of a practice.

When Beethoven sat down to write his first symphony in the late 1790s the symphony was well established as a musical form. Beethoven followed closely the models of his predecessors, especially Haydn, but also Mozart. So, for example, Beethoven uses exactly the same orchestra as Haydn; the symphony has the same number and kind of movements as its predecessors; the first movement follows classical sonata form to the letter, and like several of Haydn's later symphonies it opens with a slow introduction before the first subject appears. Analogies appear at the level of detail also, with many ideas resembling those found elsewhere: basing the first subject of the first movement around an ascending arpeggio is a very common device; in several places there are strong echoes of ideas in his predecessors' symphonies (e.g. Mozart's *Jupiter* symphony). Adopting a certain model also poses problems to be solved: the second subject would be expected to contrast with the first, so

¹¹ The hypothesis that analogical thinking is at the core of scientific creativity and judgment is developed by Margolis and has independent confirmation from research carried out by Dunbar (1996) in laboratories observing scientists engaged in hypothesis formation. See also Gentner, Holyoak, and Kokinov (2001) and Gentner and Jeziorski (1993).

Beethoven uses a descending scale; the slow introduction cannot be unrelated to the rather faster min body of the first movement, so Beethoven has to deploy ideas in the latter that recall the former, and so on. The creative process evolves subject to a considerable variety of constraints.

To point out the role of models and exemplars as well of constraints and conventions in the composition of Beethoven's first symphony is not to deny its originality. On the contrary it is to explain that the creative exercise of the imagination is not a random walk in the entire space of possibilities, but is the exploration of a particular subspace, guided by models and constraints.¹²

This account of imagination raises at least two significant worries. First, what about uses of the imagination that produces ideas that are not in fact possible (mathematical proofs that are inconsistent, for example)? Secondly, if imagination often proceeds by finding analogies with existing models, does it not follow, counterintuitively, that creativity is often derivative? Is there really nothing distinguishing a derivative from a genuinely creative work of art or scientific theory?

In response to the first problem: an appropriate notion of "possibility" will help here—perhaps the possibilities are those ideas such that the subject cannot immediately know that they don't have the value sought after (e.g. a conjecture that the mathematician cannot immediately see is inconsistent, or an idea for a plot development whose effect on dramatic tension is not obvious). We note that in practice our imagination is often imperfect in the sense that we only partially imagine a possibility. The possibility may be presented in one way so that the scientist or artist may not be able conceive of how it will appear when made concrete. It may occur to a composer that her development of a complex fugue might suitably include an inversion of the subject in augmentation. But she may need to hear the passage to be sure it has the required effect. It might occur to a scientist that the structure of some

¹² Carroll (2003: 217) cites Elster (2000) in emphasizing the importance of constraints in narrowing down the range of possibilities that confront an artist, without which the result would be paralysis rather than new work.

molecule under investigation is fundamentally the same as that of some other molecule, with the addition of certain functional groups. Yet she may not be able to see immediately whether such a molecule is stable or whether it meets pre-existing constraints (e.g. those imposed by empirical results): further calculation and experimentation may be required. This partial understanding of possibilities will often arise on our account, because the imagination will typically present a possibility in the guise of an analogy to something else: like x but different in these respects . . . What exactly that possibility is like and whether it does what the creator wants may require a process of deduction, calculation, experimentation, or just trying it out. Consequently, creative activity often involves interaction between the process of imagination and a distinct process, such as inspecting a concrete object or attempting a proof.

In response to the second problem, we concede that even derivative works of art may use imagination to some extent, and thus count as minimally creative. More creative artists and scientists are more imaginative: they are able to scan more possibilities; they use more remote analogies and bring together more disparate ideas than less imaginative individuals (Dunbar 1996). They are not satisfied with finding just one solution to the problem they have set for themselves, but find many, from which they can then choose the best. Furthermore, seeing which possible analogies might be useful itself requires the use of imagination: the creative thinker considers whether and how a new analogy might be appropriate and may be the route to a solution to her problem or the source of new ideas for her artwork.

Beethoven's contemporaries, such as Luigi Boccherini and Anton Eberl, were presented with the same models and constraints as he, yet did not write the same symphony. The first symphony did not just occur to Beethoven's mind; on the contrary, the work was the product of a lot of thought over several years during which many ideas (prompted by experience of exemplars, as discussed above) will have occurred to Beethoven. Not all of Beethoven's ideas were good and many of his musical ideas might well have occurred to Boccherini and Eberl (Eberl's work was itself often mistaken for Mozart's). Beethoven was not above earning money by using ideas that were of only modest quality. However, for his first symphony he rejected all but the best ideas. That is to say, the exercise of creativity by Beethoven is accompanied by the exercise of judgment, rejecting ideas that failed to solve the

problems he faced and which failed to meet a high standard of musical value.¹³ The tempering of creativity with judgment is not a simple matter of employing first imagination and then judgment; rather it is interactive and iterative, with repeated exercises of imagination and judgment, both at the small scale (does this one bar-long musical phrase work?) and the larger scale (is the development section too long and does it suit the character of the piece?). So judgment is not exercised not just on the finished product but at every stage in its development. Judgment, in our view, is not itself part of the creative process but is both a guide and a prompt to it. We return to the relationship between creativity and judgment later.

The other elements of our account of creativity can be treated more briefly. Fertility is important if we are to think of creativity as a trait. An individual might have one imaginative and novel idea—one typical of a creative individual, but we would not normally attribute creativity to an individual on the basis of one idea alone (but see the next paragraph). Motivation we regard as important to the trait of creativity as it captures the idea that the creative individual is one who is disposed to bring new drawings, constructions, music, theories, and such like into existence, in short has an “urge to create”.¹⁴ Creativity is not merely an ability: someone who could create things, but does not make the effort to do anything of the sort is not a creative individual.¹⁵

¹³ Consider Poincaré’s view of discovery in mathematics, “What, in fact, is mathematical discovery? It does not consist in making new combinations with mathematical entities that are already known. That can be done by anyone, and the combinations that could be so formed would be infinite in number, and the greater part of them would be absolutely devoid of interest. Discovery consists precisely in not constructing useless combinations, but in constructing those that are useful, which are an infinitely small minority. Discovery is discernment, selection.” (Poincaré 1908/1914: 50–1.) We take it that what Poincaré calls ‘discovery’ is the combined operation of creativity and judgment as we have described them. (We are grateful to Mike Stuart for this reference.)

¹⁴ Collins and Amabile (1999) emphasize the importance of motivation in understanding creativity, as does Kieran (2014).

¹⁵ We leave open the question of whether the motivation to create needs to be non-instrumental (i.e. a desire to create for its own sake) or whether an instrumental motivation can be sufficient (e.g. a desire to win a Nobel prize, which generates a desire to produce novel, imaginative science).

As a disposition or bundle of connected dispositions, these characteristics of a creative individual need not always be on display. As for all dispositions, the manifestation of creativity requires the right stimulus or triggering conditions to be present. In particular a creative individual needs the opportunity and resources to think and then to develop her ideas and to bring them to fruition. An individual whose life gives her no space for creative thought may still be a creative individual, likewise an artist who cannot afford the materials her work requires. A disposition may also be present without its manifestation even when the stimulus conditions are propitious: dispositions can be subject to interferers (antidotes/masks, finks). The processes of creativity may be blocked or interrupted. Depression, for example, can stifle creativity; though stifled it is not removed. Such a person is still creative even though she is not creating, just as a talented footballer's skill may be masked but not removed by a minor injury. That said, creativity can be lost, for a number of reasons, from brain injury (Eslinger *at al.* 2007: 788) to lack of use—creativity unexercised may diminish.

3 Creativity is not essentially disposed towards producing value

According to many psychologists and philosophers, our definition of creativity lacks a crucial element: the creative disposition is essentially a disposition to create objects of *value*.

“Creativity involves generation of novelty that deals effectively with a problem or need of an individual or community.” assert Cropley and Cropley (2013: 5). “The need may be concrete, abstract, even spiritual.” Psychologists mostly prefer a two part definition of creativity: originality plus “effectiveness” (Barron 1955; see Runco and Jaeger 2012). “Effectiveness” captures the idea of utility or value—a creative idea should be worthwhile, for example, by solving a problem or meeting a need. Boden (2010: 29) lays down a three-part definition: “Creativity is the ability to come up with ideas or artefacts that are *new, surprising, and valuable*” but does not defend the inclusion of value.

We reject the requirement that what is created has value. First, on the ground that creativity can have wholly negative outcomes. Secondly, because we can recognize an object as being the product of creativity independently of identifying the value in that object. And thirdly,

because individuals who imaginatively produce some objects of value, and some objects without value, are most plausibly manifesting the same disposition in so doing; rather than two different dispositions (one to imaginatively produce things of value; one imaginatively to produce worthless things).¹⁶

3.1 Creativity can produce objects of no value.

If creativity is defined as the disposition to produce objects of value, then it ought not to be possible to be creative and to be disposed to produce objects that have no value. We consider three ways in which creatively produced objects might have value and argue that it is possible to exercise creativity in producing objects that have no value in any of these respects.

- First, creatively produced objects might have objective value, for instance a creatively produced work of art might have aesthetic value (beauty or sublimity, for instance); a creatively produced scientific theory may have “scientific value” (which may be truth, knowledge, or understanding etc.)
- Secondly, a creatively produced object may be valuable in virtue of being good “of its kind”.
- Finally, an object might be good in virtue of being good for the individual who produced it. Perhaps it is good for her because it contributes to her well-being, objectively considered; perhaps it is good for her subjectively, because it satisfies her preferences or meets her own standards for her life going well.

3.1.1 Creativity without objective value

Creativity can be exercised in the production of objects of no value, or even negative value. Accountants may exercise creativity in finding new ways to hide profits or to avoid tax. But their ideas are socially and morally harmful. The zealot of the French Revolution, Jean-Baptiste Carrier, executed his victims in increasingly novel and imaginative ways, including

¹⁶ Grant (2012) also argues that creativity (which he calls “imaginativeness”) does not necessarily produce objects of value, though he does require (as we do not) that it should be reasonable for the creator to think that her ideas would be valuable, or achieve something.

the infamous “Republican Marriage” whereby a male prisoner and a female prisoner would be bound together, naked, and then thrown into the Loire. There is no contradiction in the idea that creativity can be put to terrible ends. Nor in such cases do we think that there is some value to the expression of creativity that is just massively outweighed by the harm in the product. Rather, the creative use of the imagination in producing harm makes matters worse.¹⁷

So creativity cannot be a disposition to produce objects that have objective value.

Consider a scientist who creatively devises a theory that turns out not to be true. Such a theory may have no direct scientific value whatsoever.. It might not even be approximately true; it may provide no knowledge and no understanding. Percival Lowell’s theory that there are canals on Mars, an imaginative explanation of apparent lines that Giovanni Schiaparelli and he perceived, is one of very many valueless but creative scientific ideas.

Of course we acknowledge that an idea may not be true (even approximately) but may nevertheless have an indirect value. Investigating a plausible (but false) hypothesis may help science to progress. Discovering why it is false may help our understanding of the subject matter and may even point us in the direction of the truth. Mill’s (1859) defence of free speech makes a similar point—our understanding of the true may be deepened and made more resilient by critical engagement with the false. In order to gain knowledge by inference to the best explanation, it is important to consider the strengths of competing (false) hypotheses to know that the true hypothesis is true. At the same time, not just any falsehood can help us better appreciate the truth. Some scientific ideas do not even have this indirect value. They are completely worthless. (Below we mention the work of Nikola Tesla which included worthless ideas for a thought camera and a death ray, and Herschel’s hypotheses about life on the Moon. Creationist ideas, such as special creation, may be creative theories that reconcile creationist precepts with the evidence. But they are scientifically worthless.)

¹⁷ Cropley and Cropley (2013) analyse in detail the contribution of creativity to crime.

3.1.2 Creativity without attributive value (“good of its kind”).

Although Carrier’s republican marriage was not objectively good (rather the opposite), perhaps there is something else to be said in its favour. Indeed, considered as a method of torture, Carrier’s republican marriage was very good—effective at inspiring fear in his enemies and causing suffering in his victims—thus excellent according to the standards of its kind. Maybe all creatively produced objects are good with respect to their kind.

This suggestion avoids the problems of tying creativity to objective value. But it has a very significant difficulty of its own. Objects belong to multiple kinds and that something might be good *qua* member of one kind (method of torture) but not of another (just system of punishment). It would be a contradiction to say that Carrier was creative, in virtue of producing an effective torture, but not creative, in virtue of failing to produce a just punishment. Presumably, we must avoid this inconsistency by saying that creativity is the disposition to produce objects that are good *qua* some relevant kind (even if there are other kinds to which they belong, by whose standards they are not good). Typically (though not always) the most relevant kind will be that intended by the creator.

But this will not do either. In science a scientist may creatively devise a novel hypothesis, investigate it, and find that it is a dead-end. As theories go, it was not a good one. Indeed if it is a mathematical conjecture it might in fact involve a contradiction. Consider Frege’s *Grundgesetze* (1893, 1903), which, whatever its other merits, must be regarded as a failure with respect to its most salient (and intended) kinds—a sound proof or attempt to derive the truths of mathematics from the laws of logic—because of its inconsistency. Russell nonetheless comments on Frege’s dedication to creative work (Russell 1962). As mentioned, failed scientific ideas can be good in other ways. As a member of the kinds ‘stimulating idea’ or ‘inspiration to others’, Frege’s work did in fact have value, for example through the influence its inconsistency had on Russell. But it might not have had that value. It is not relevant to whether Frege was creative, that his failure caused others, later, to be creative. If Frege had never published his work and had influenced no-one, he would still have been creative in writing the *Grundgesetze*. Historians of mathematics recognise the creativity in

Girolamo Saccheri's (1733) several (failed) attempts to provide Euclid's fifth (parallel) postulate, but unlike Frege's work it was ignored and did not even have positive effects on subsequent mathematics.

Similarly, in the arts creative ideas may fail to have value by the standards of a relevant or intended kind. Arseny Avraamov was an avant-garde composer whose works included novel microtonal compositions, graphical sounds created by drawing on the sound track of a film, and the famous symphony of factory sirens. It is at best unclear whether these works are good of their kind: the evidence of posterity is that they were a dead end. But there is no doubting Avraamov's creativity.

3.1.3 Creativity without value for the creator.

Perhaps we have been looking in the wrong place for the value of creativity. Perhaps it is not that the objects produced have some objective value or are good of their kind, but rather that they are good for the individual who creates them. Indeed some of the definitions of creativity regard the value in question as value for the creative individual.

In what way might a creatively produced object be good for an individual? There seem to be two possibilities: either it contributes to the individual's well-being, objectively conceived; or it satisfies her preferences and thus contributes to well-being, subjectively conceived.

The latter is certainly not true of all instances of creativity. Many creative individuals are often intensely dissatisfied with their work (Johannes Brahms burned many of his compositions; Gerard Manley Hopkins and many others have done likewise).

Suppose instead we take an objective account of well-being. Is it more plausible that creatively produced objects contribute to a good life? Not necessarily. In many cases the object neither serves a need, nor brings a benefit. The act of creation may bring fulfilment to the individual. But that does not make the *product*, the work produced, valuable. The work may not give its creator pleasure; it may not satisfy her preferences; it may not meet the standards that she herself has set, it may fail to solve the problem that she posed for herself.

Moreover, depending on the details of the account of well-being, it may be that producing objects that are harmful or otherwise bad is not good for you. Was it really good for Carrier to spend his time creating ever more elaborate methods of torture? However satisfying he found the work, and how effective the methods he devised, the answer is surely no.

Perhaps the connection between creativity and well-being might be saved by the claim that creatively produced objects always constitute an achievement, and achievements are always good for you. But first, unless creatively produced objects are regarded as achievements simply in virtue of being creatively produced, it is far clear that they do actually constitute achievements. Is a false scientific theory, a dead-end, an achievement? There is no obvious reason to think so. Secondly, even if we accept that creatively produced objects are often (or even always) achievements, it is not at all clear that all achievements are good for you. As we have already said, Carrier's achievements in the field of torture were not good for him.¹⁸ It is possible to procrastinate creatively. It is not very plausible either that this constitutes an achievement or that it is good for you, in some respect or other.¹⁹

Thus we have considered the three most obvious ways in which creativity might be the production of value, and have shown that none is essential to creativity. Nor do we think it plausible that creativity is the production of one or other of these. Creative individuals can be disposed to produce objects which fail to have value in any of these respects.

¹⁸ Many, but not all, objective theories of well-being involve some moral content, such that actions that are morally wrong (or in other ways falling short of moral virtue) are to that degree not in your interests. But the point holds as long as there are aspects of well-being other than achievement, even if they are not moral. For in that case even something is an achievement but is very bad with regard to other aspects of well-being, may not overall be in your interests, and so producing it may not be good for you.

¹⁹ Grant (2012) also argues that creativity (imaginativeness) is not always good for its possessor, but that it can be, through its connection to autonomy and (sometimes) to self-realization.

3.2 *Recognising creativity without assessing value*

If creativity was the disposition to produce objects of value, it would not be possible to recognize instances of creativity without assessing the value of the objects produced. If the object turned out to be valuable (and other conditions were met), its production might be the exercise of creativity; if not (*ceteris paribus*), not.

But it is not necessary to evaluate the objects produced in order to assess the creativity involved in their production. Lies can be banal, but the detailed, imaginative lies of a master spy can be highly creative. In World War 2 both sides used elaborate deceptions against their enemies. Operation Mincemeat disguised a dead body as a Royal Navy Officer carrying faked letters to deceive German High Command regarding Allied invasion plans in Italy. In Operation Greif, Otto Skorzeny and other English-speaking German soldiers in American and British uniforms misdirected allied tanks and infantry while sowing confusion and alarm among allied forces during the Battle of the Bulge. We can detect and compare the creativity in these undertakings without assessing the nobility or otherwise of the causes they served. For many forms of activity there are creative ways of carrying them out in addition to mundane ways. Leonardo da Vinci drew remarkable sketches for flying machines. 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; instead we need to know how imaginative, novel and fertile were his ideas, and how strong his motivation to bring them to fruition.

3.3 *The creative disposition*

Above we argued that we could judge Otto Skorzeny as creative without approving of or even assessing the value of what he did. All we need to see is that, just like Ewen Montagu, the mastermind behind Operation Mincemeat, Skorzeny was imaginative and original; he had many such ideas and was strongly motivated to carry them to completion. In these respects, their cognitive and non-cognitive dispositions were very similar. In short: they were both creative and in the same way.

Similarly, we can often see the same set of dispositions within one individual sometimes creatively producing objects of value, sometimes creatively producing objects that are worthless. The inventor Nikola Tesla produced, alongside productive work on alternating current, a wide range of bizarre ideas for inventions, including a death ray, as well as theories of no merit concerning the nature of spacetime and the electromagnetic field. William Herschel, discoverer of Uranus and of infrared radiation had unsupported theories about the habitability of other planets (that the Moon was rather like the English countryside, 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 Tesla and 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.

4 The original nonsense argument

The argument most often cited as a reason for including value in the definition of creativity is that it serves to distinguish creativity from the disposition to produce “original nonsense”. Generating the latter would not, the argument goes, be an exercise of creativity, and so something in addition to originality is required. That something is value. Stokes (2016: 248), for example, asserts:

... most theorists maintain that creativity requires value. As Kant put it, “there can also be original nonsense” [1781/2000, 5: 308, p. 186], and nonsense is not creative. So, creativity requires, in addition to novelty, that an x be of some value to its make and/or its context of making.

As it stands, this argument is weak. Even if the premise is correct, that there is no creativity in the original nonsense, that shows only that originality is not sufficient, not that value is necessary. It might be that the argument presented is a shorthand for a more detailed argument provide by Kant himself. But it seems to us that Kant was not offering the argument attributed to him.

Beautiful works of art are a puzzle for Kant. How can they be created? Not by the mechanical application of a rule, he thinks, for no such rule could possibly produce works of genuine value. Any that are produced by the application of a supposed rule are, he says, of very poor quality.²⁰

What we call creativity, Kant (1781/2000, 5: 307, p.186) describes as ‘genius’: ‘the talent that gives the rule to art’.²¹ Genius is not a matter of following of a rule or of mere imitation. Instead, it consists in the imagination and understanding.²² The key question, then, is the relationship between genius and beautiful art. Unfortunately Kant is not completely clear on the matter.

When he introduces the term, he does say that genius is the quality that produces beautiful art, which sets the standard for others (1781/2000 5:308, p.186-7). But a little later, he says that creative genius needs to be constrained if it is to produce works of value: it must be tempered by one’s aesthetic judgment, or ‘taste’:

Taste, like the power of judgment in general, is the discipline (or corrective) of genius, clipping its wings and making it well behaved or polished . . . and by introducing clarity and order into the abundance of thoughts it makes the ideas tenable, capable of an enduring and universal approval . . . Thus if anything must be sacrificed in the conflict of the two properties in one product, it must rather be on the side of genius. (1781/2000, 5: 320, p.197).

In this quote, it seems that for Kant, just as for us, creativity (“genius”) is the disposition to produce ideas imaginatively. To produce valuable objects, it must be combined with judgment, evaluating which ideas are worth pursuing. Judgment is separate from creativity, a guide and constraint on it; not a part of it. Here, Kant’s view is similar to our own; he denies

²⁰ Kant 1781/2000, 5: 307–8, 186-7.

²¹ Kant 1781/2000, 5:307, p. 186.

²² Possibly also ‘spirit’ which is the quality that gives e.g. poetry energy and life (1781/2000, 5: 313, 191-2), though this is perhaps brought about by the proper relation of imagination and understanding, according to Kant.

that creative geniuses (in the absence of good taste) are disposed to produce valuable objects.²³

Even if Kant does not make the case, perhaps there is still a good argument that original nonsense is not creative, and thus that creativity must involve value. Without more detail, it is difficult to assess such an argument. Nonetheless, under any reasonable interpretation, it is unsound.

Either the original nonsense has content or it does not. First assume that it does not. That makes the premise, that the original nonsense is not creative, more plausible. But then the argument is clearly invalid. The missing element that creativity requires in addition to originality might be anything that is not itself entailed by originality but which is inconsistent with being nonsense. Value is one candidate, but there are others—notably, imagination. If the original nonsense has no content, then it cannot be the product of the imagination, which

²³ Can this passage be reconciled with Kant's earlier account of genius as the talent for producing valuable art? One way of doing so is to reinterpret it very significantly. Perhaps Kant really means that spirit and taste together produce beautiful art. This fits with the idea that genius – now understood as spirit and taste combined - produces valuable art. The problem is that Kant explicitly talks about genius (not spirit) being constrained by taste here. So this interpretation would have him making a very significant mistake about his own theory. Moreover, the two passages can be reconciled in a way that is more charitable to Kant. The earlier discussion is in a context in which Kant is arguing that genius is necessary for beautiful art ("beautiful art is possible only as a product of genius" 1781/2000, 5: 307, p.186). When he says that "its products must at the same time be models, i.e. exemplary" he is standardly interpreted as meaning this to be part of the definition of genius, i.e. that genius is also sufficient for beautiful art. But he may instead be trying to say that, since genius can produce originality of all kinds, it only produces beautiful art when its products are exemplary (i.e. when genius is constrained by taste). As a reading of Kant, this has the advantage of making his views consistent without making a very blatant error (of writing "genius" when he meant "spirit"); instead, it has him merely moving from a discussion of how genius can produce beautiful art to the conditions under which it will do so (which he will describe in detail later), without marking the distinction clearly. It is therefore a more charitable reading of Kant, and, of course, it supports our own account of creativity.

is essentially representational.²⁴ Therefore the imagination is a plausible candidate for what distinguishes original nonsense from a creative product. No content means no use of the imagination; which means no creativity.

On the other hand, if there is some content to the “nonsense”, then it is not so clear that there is no creativity at all. We use many terms denoting traits to describe people when they have a trait to a notably greater degree than normal; even though we acknowledge that many (perhaps all) have the trait to some degree. We typically use the term “creative” to pick out those individuals who are creative to a degree somewhat greater than normal, while being willing to acknowledge that the majority of people can show creativity to a modest degree if given the opportunity. So it might be that a concrete instance of alleged original nonsense would be recognized as an instance of creativity, albeit of the most minimal kind. (What linguists call “creativity” is the ability to produce novel sentences. This use is not inappropriate. It just focuses on one form of creativity some of whose instances are quite insignificant with regard to creativity in the wider sense, but not entirely empty.) With this thought in mind, we might distinguish between “minimal creativity” and “substantial creativity”.²⁵ Original nonsense with some content may be a mark of minimal creativity but not of substantial creativity.

²⁴ Kind 2016: 3. That imaginings are representational, and so have intentional content, is widely accepted among theorists of the imagination and is entailed by our view of the imagination as searching the space of possibilities.

²⁵Or ‘little-c-creativity’ and ‘Big-C-Creativity’ to use expressions in common use among psychologists. Minimal or little-c-creativity is creativity to the degree that pretty well every human beyond infancy possesses, whereas substantial or Big-C-Creativity is the greater and relatively unusual degree of creativity possessed by individuals we characteristically call ‘creative’. Psychologists are not all in agreement as to where to draw the line between little-c-creativity and Big-C-Creativity, which is why we have avoided the terms. Sometimes it appears that the distinction is close to the minimal/substantial distinction, while for others Big-C-Creativity is the creativity only of geniuses.

5 The limited contingent and instrumental value of creativity

We have argued already that creativity does not always produce value. But there may be nonetheless a significant, if weaker, relationship between the two. Let us concentrate on two areas where creativity is thought to be particularly valuable, the arts and sciences. First of all, we must concede that minimal creativity is valuable here, since it is required in order to engage in the kinds of activity characteristic of a normal human life, including the production of works of scientific and aesthetic value. But those who praise creativity clearly have more than minimal creativity in mind. We might put their claim as follows: the more creative the process, the more likely it is to produce more (aesthetic or scientific) value.

According to our definition, greater creativity means more ideas, more originality, more imaginativeness, and a greater motivation to bring the objects to completion. Is this set of dispositions more likely to produce objects of a greater scientific or aesthetic value than a less creative set? It seems plausible that it might: the process of creation, the joint exercise of originality, imagination, fertility, and motivation, might be selectively directed towards the more valuable of the possible works. When scientists generate a new hypothesis, the process by which they do that could well give the resulting hypothesis a greater chance of truth than a hypothesis selected at random. Likewise more creative processes are more likely to produce aesthetically valuable works of art. But though this sounds plausible, it is not true that more creativity tends to produce more value. First, because though the track record of creative individuals producing value in science and the arts looks impressive, this is misleading, for their less successful efforts tend to be forgotten. Secondly, because extra creativity does not tend to produce more value, except in very specific and unusual circumstances.

5.1 The scientific and artistic objects that we value are not typical of the products of creativity.

Is it true that more creative processes are more likely to produce more value? To confirm this hypothesis, you might think that you could just look at the track record of creative individuals in the arts and sciences. But matters are not so simple for two reasons: first the data are not straightforward to interpret; secondly, since the products of the arts and sciences are the result

not only of creativity but of other factors, one must attribute their successes (when successful) to creativity together with these other factors.

Arguably most scientific ideas that get as far as publication have a high degree of truthlikeness (nearness to the truth).²⁶ Science today is a highly integrated, and well-resourced activity, which in central areas is founded on well-confirmed theories and supported by well-tested techniques. It was not always so. It is possible for scientific cultures to flourish whose ideas are much further from the truth. Ancient Greek science was an important achievement, but much of the scientific work of its greatest exponents, Aristotle, Ptolemy, and Galen, was not only mistaken but deeply anchored in false assumptions (e.g. the circular, geocentric model of planetary orbits and the humoral theory of physiology). These individuals and their contemporaries were often highly creative, but their creativity was not itself conducive towards to the truth, knowledge, understanding, or anything else of scientific value. Instead, it tended to lead them to novel but false hypotheses which creatively reconciled their false assumptions with their (more accurate) observations. Modern science differs in that much (though probably not all) is based upon true background assumptions and employs more reliable methods; it does not differ in that its practitioners are more creative. If creativity is in part responsible for the success of modern science, that is only because it is being used in a particular context.

Furthermore, these comments focussed on published scientific ideas; many ideas will be rejected well before they get to that stage. So the proportion of all creatively produced scientific ideas that are false is rather greater than the proportion of published ideas that are false. The ideas that reach publication are ones that are the products of both creativity (in conceiving of them in the first place) and judgment (in deciding whether to retain the idea rather than reject it). In summary: works of scientific value tend to be produced by a combination of creativity and judgment, when the background conditions that are conducive to success are in place.

²⁶ Many will regard this as optimistic. If the claim is false, then so much the worse for the idea that scientific creativity is conducive to the truth

Is the same true for the arts? The artistic output that reaches the public will, as in science, have gone through a process of filtering, from which we may conclude that even if most publicly available artworks have aesthetic value, that is consistent with most artistic ideas, the immediate products of creativity, having little or no value. Many artistic ideas are rejected straightaway by the artist, who does her own assessment of which to pursue (and how to do so). But even if an artistic idea meets her own standards and she chooses to carry it through to completion, very many such works of art have been forgotten; not all of them unjustly. The audience as well as the artist selects from the ideas generated by the artist's creativity; and so though it may appear that it is her creativity that produces the value, it does so only when tempered with judgment. On its own, creativity is not enough. And as in science, the background conditions are important. An artist may need a "room of one's own", the right materials, an artistic context that supplies both sources of inspiration and foils to react against, and perhaps also an audience ready to appreciate what she creates. Success is a combination of all of these factors, and cannot be attributed to creativity alone.

5.2 More creativity does not tend to produce extra value, except in specific and unusual circumstances.

The first point to note is that many aesthetically valuable objects can be produced without any creativity at all (or at the most, with minimal creativity). Reproductions of paintings and drawings whose originals are aesthetically valuable, whether careful copies or mass-produced prints, are valuable too. The same goes for each screening of a good movie or playing of a CD or mp3.²⁷ The point is less obvious for science. However, if we consider that scientific knowledge and understanding are valuable, it is clear that new tokens can be created that are not original. The repetition of a famous experiment in a school laboratory can bring new knowledge and understanding to the students present. So creativity is not necessary for the production of value in the arts and sciences when the objects in question can be duplicated or repeated. Nor would additional creativity be any sort of advantage: precisely what we value in these objects is that they are an exact copy of the original.

²⁷ Sibley (1985) emphasizes this point.

However, in the case of a new symphony or a new theory, things are different. Here what is created is an abstract object. For symphony B to differ from symphony A, B must differ in some intrinsic respect from A; likewise for theories. So to create B at all requires creating something novel.²⁸ But it does not follow that they must all be devised creatively.

Good new scientific ideas can be generated in a systematic (i.e. unimaginative) way. Salvarsan, the first effective treatment for syphilis was discovered by the systematic synthesis and testing of organic arsenic compounds. When Paul Ehrlich and Sahachiro Hata hypothesised that compound 606 (the sixth compound in the sixth group—arsphenamine) could be have an antisyphilitic capacity, the idea was neither a shot in the dark nor the product of imaginative inspiration. Likewise, following the development of penicillin, Selman Waksman undertook a systematic study of compounds of microbial origin for antibacterial activity, thereby discovering several new antibiotics, including streptomycin, the first antibiotic effective against tuberculosis. Thus there can be hypotheses and discoveries of great scientific value that involve the exercise of the imagination minimally, if at all. Hence it is not the case that all scientifically valuable objects were produced through (substantial) creativity.

Even so, it might still be true that more creativity—more originality, more imagination—tends to produce better ideas and so more valuable objects. But that is not the case. Value is typically produced by close attention to previously successful attempts to create value. Thomas Kuhn (1959/1977: 234) expressed the point thus: “Under normal conditions the research scientist is not an innovator but a solver of puzzles, and the puzzles upon which he concentrates are just those which he believes can be both stated and solved within the scientific existing tradition.” In this paper, “The Essential Tension”, Kuhn emphasised the importance and value of convergent thinking in science: thinking in normal science is highly constrained and it is in large part successful precisely because it is so constrained. The portion of the possible space of scientific ideas permitted by the paradigm is narrow, and this directs the researchers to solutions that are most likely to work. Using the imagination more

²⁸ Some hold that abstract objects exist sempiternally and so are not created. If that is your view, then the argument stills holds, *mutatis mutandis* (e.g. replacing ‘create’ by ‘discover’).

extensively to find more remote and more original possibilities, is unnecessary and unlikely to be fruitful. Only during a crisis, when use of the paradigm to guide the imagination encounters insurmountable problems, is a wider search necessary. It is only at that point that more creativity is a benefit.

That may be true of science, where it is implausible that working outside the established scientific tradition will typically produce good results. But what about art? Surely greater artistic creativity tends to produce better art? And the unconstrained use of the imagination is exactly what we should expect from a successful artist?

The Romantic tradition emphasizes the importance of originality in artistic creation, where this is understood not just as the artist producing something different from what has previously been created, but that she does so as an expression of her own individual sensibility. According to a rather extreme version of Romanticism, this is best achieved by the artist imaginatively exploring the remotest possibilities, unguided by, perhaps even uncontaminated by awareness of, artistic achievements of the past. We can see one (less extreme) version of this idea in Kant's remarks that creative genius cannot be taught, does not use rules, and cannot succeed through mere imitation (1781/2000, 5: 308, 186–7).

But even if the mechanical application of a rule or mere imitation of existing works of art is not likely to produce new works of aesthetic value, it does not follow that use of the imagination without constraints or guides is likely to do better. On the contrary, there are very many possible works of art which an artist might contemplate creating, but the vast majority of them have no value at all. Imaginatively exploring them is a waste of time. How can an artist avoid such a fate; and focus her mind on the possibilities most likely to have value? The answer is obvious: she can look to the past, to valuable works of art that already exist. Of course, unless her purpose is to create reproductions, she must not imitate them

exactly. Nor should she attempt to extract rules of artistic creation. Rather she will treat these works, and the tradition from which they come, as guides and exemplars.²⁹

Earlier we mentioned two important uses of the imagination in creativity: to find ways of simultaneously meeting a number of constraints at the same time (to find the right poetic form to express a particular emotion, for instance, and then to find the right words within that form); and to bring together ideas perhaps from what were, until now, different artistic traditions, forging an exemplar for the future. In both cases, past successes can be a guide to solving new artistic problems, allowing the artist to fulfil her artistic intentions.

If this is right, then on the one hand a certain amount of creativity—of imagination, fertility, originality and motivation—is essential to the production of a certain kind of aesthetic value. But on the other hand, more creativity, that is, the imaginative exploration of more remote possibilities, unguided by an artistic tradition or prior works of aesthetic value, is both unnecessary and unlikely to be fruitful.

This is not to say that valuable works of art cannot be produced through a less constrained use of the imagination. Artistic revolutions do occur. But they typically do so because an artist has recognized the limitations of a particular tradition, forcing her to turn further afield to find a way to fulfil her artistic intentions, or to find a possible artwork that meets her own standards of success. At this point, more creativity is better than less. But even then, only certain aspects of the artistic past are rejected. Typically there remains considerable continuity with other aspects of the tradition; features common to the old and the new. This shared background allows artist and audience to find the less familiar artworks intelligible and appealing.³⁰

²⁹ Carroll (2003) makes exactly this argument, emphasizing the importance of artistic traditions in the creation of all valuable works of art. In so doing, his claims for the role of tradition in art parallel those made by Kuhn (1959) regarding scientific traditions.

³⁰ Carroll 2003: 227.

It follows that the Romantics and others who celebrate the completely uninhibited use of the imagination, must be generalizing from situations in which the artistic or scientific tradition fails to be an adequate guide. But they are making a mistake, because these circumstances are unusual and unrepresentative. Furthermore, the Romantic view over-emphasizes the degree of discontinuity: no revolution is a root and branch break with tradition.³¹ And even in those aspects where tradition is rejected, it acts as a foil, giving significance to the revolutionary development.

Whilst minimal creativity may be necessary to the creation of (almost) all value in the arts and sciences, more substantial creativity is not only unnecessary, but can actually be in tension with the production of value. As we have emphasized, typically, the best way to create value is to focus your imagination on a range of possibilities, guided by previously successful attempts at producing value. Allowing your imagination to roam freely across a much broader space of possibility, generating wildly novel ideas, is a pleasant distraction; an activity that is a substitute for, not a means to, the creation of value. In normal circumstances, more creativity tends to result in less scientific and aesthetic value, than less creativity would produce. It is a waste of time and effort.

6 Conclusion

Modern liberal societies set great store by creativity; the value placed on it is unquestioned. It is hardly surprising then that almost all theorists regard value as essential to creativity. Yet the only argument typically cited in favour of that standard view, the “original nonsense” argument, is unsound (and is not even to be found in Kant to whom it is attributed). Against the standard view, we have argued that creativity can easily, in the wrong circumstances, be put to producing objects of no value and of disvalue (on any reasonable construal of “value”). It is the same disposition in either case.

³¹ Kuhn is sometimes caricatured as taking scientific revolutions to involve radical discontinuities. This ignores a whole chapter in *The Structure of Scientific Revolutions* (1962) entitled “Progress Through Revolutions”.

Rather than value, we propose that that the imagination is essential to creativity: creativity is the disposition to use the imagination in the fertile production of ideas and the motivation to bring those ideas to fruition. Even though such a disposition will not necessarily produce valuable ideas and objects (not even *ceteris paribus*), one might still think that it is likely to produce value. The Romantic conception of creativity maintains that it will. The more creative an individual is, the better. And the less she is constrained or guided by tradition, the more creative she will be. We deny all this. Creativity tends to produce works of value only when two additional conditions are in place: a tradition of models and exemplars that are themselves valuable, to stimulate and guide the imagination in its search for new items of value; and good judgment to discern which of the new ideas produced by the imagination do indeed have value.

This means, of course, that we are not against creativity in all its manifestations. Minimal creativity is essential to virtually any artistic or scientific activity. We acknowledge that, in the right circumstances and aided by well-trained judgment, creativity does produce valuable new ideas. What we are against, is the unreflective approval of creativity even when these conditions are not met. This attitude is both widespread and deeply misguided, since it leads us to look for aesthetic and scientific value in all the wrong places, instead of where we know it can be found: in the imaginative transformation of the scientific and artistic tradition.

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