The Work of Art in the Age of Automated Production

Introduction

Paul Valéry writes at the beginning of his short essay "The Conquest of Ubiquity":

Our fine arts were developed, their types and uses were established, in times very different from the present...But the amazing growth of our techniques, the adaptability and precision they have attained, the ideas and habits they are creating, make it a certainty that profound changes are impending in the ancient craft of the Beautiful. In all the arts there is a physical component which can no longer be considered or treated as it used to be, which cannot remain unaffected by our modern knowledge and power...We must expect great innovations to transform the entire technique of the arts, thereby affecting artistic invention itself and perhaps even bringing about an amazing change in our very notion of art. (Valéry 1964 [1928], 225)

The passage describes a moment in the history of art in the West in the 20th century characterized by the introduction of new artistic technologies of production and reproduction such as photography. The passage serves as the epigraph to Walter Benjamin's "*The Work of Art in the Age of Mechanical Reproduction*" in which he contends that the analyses necessitated by the condition described by Paul Valery compels us to "brush aside a number of outmoded concepts, such as creativity and genius, eternal value and mystery..." (Benjamin 1969[1936]).

The advent of AI systems like Midjourney, Stable Diffusion, and DALL-E places us again at a critical point much like the one described by Valery and to which Benjamin was reacting, if not more critical. These AI systems can produce synthetic images from simple text descriptions. They thus allow for the generation of often high-quality art from the simple input of a text description specifying the content (and even style) of the desired output. Such systems present a dramatic advancement whose consequences have already begun to ramify into our thinking about aesthetics and the nature of intelligence and necessitate the sort of re-assessment indicated by Benjamin of classical philosophical notions such as creativity. There has been some philosophical recognition of this need and concepts such as authenticity have already been scrutinized in the light of the reconfigurations of creative possibility occasioned by such systems (for instance Floridi 2018). In this paper, I focus on the concept of creativity.

A re-assessment of the concept of creativity is not just timely, but long overdue since even as early as Benjamin's "*The Work of Art*", as can be seen from the quote from that text above, the concept already appeared as a ripe target for re-assessment or elimination. Other developments in the history of aesthetics, such as some varieties of anti-intentionalism, can also be read as requiring the reassessment or elimination of the concept of creativity.¹ Is the current concept of creativity still relevant in the age of automated art machines (AAMs) like Midjourney, DALL-E, and Stable Diffusion? Can such machines be said to be creative? If the concept is not appropriate for contemporary conditions, what new concept should stand in the place of creativity in judgments of AAM augmented artistic production? Is it reasonable to have one set of concepts for traditional art and AAM art, or is there a need for a single concept which embraces both?

In this paper I use the occasion of these questions raised by AAMs to pursue a revisionary assessment of the concept of creativity. I will argue that we can discern at least three significant purposes fused uneasily into the classical concept of creativity (an institutional one, an existential one, and a scientific one) and that the classical concept of creativity does not fulfill these purposes very well because of this lack of internal differentiation. My task in this paper then is to perform that variety of revisionary analysis whose task is to split apart such undifferentiated concepts (cf. Chalmers 2020) and find "properties in the vicinity (or neighborhood)" (Cappelen 2020) of the classical concept which meet the demands of these purposes. I then put the disentangled institutional, scientific, and existential concepts of creativity to work to answer some of the questions occasioned by machine creativity (e.g. "are machines creative?").

The paper progresses as follows: I begin in §2 with an overview of AAMs. In §3 I provide a thematic overview of the classical concept of creativity; this overview points the way to the three purposes mentioned above and hints at an unhelpful conflation of these different conceptual purposes in the classical concept of creativity. In §4 I elucidate the three distinct concepts of creativity I disentangle from the classical concept and put them to work answering questions raised by AAMs. I then conclude.

Automated Art: An Overview

¹ For instance Barthes' (1977[1967]) variety of anti-intentionalism replaces the "author" as a locus of creative production with the "scriptor" who is merely a mechanical source for objects which only attain artistic status when they are read or observed by an audience. I only raise such examples as further theoretical motivation for my project; whether or not such positions are correct is the concern of a later paper.

In 2016, Microsoft and a group of partners including researchers from TU Delft, The Mauritshuis, and Museum Het Rembrandthuis teamed up on a project called "The Next Rembrandt" to create a new Rembrandt, a new painting by the long deceased 17th century Dutch master Rembrandt van Rijn which he had not painted but which was nonetheless still a Rembrandt painting, "A Rembrandt that Rembrandt never painted" (Floridi 2018, 319). By using a computational system to abstract 150 GB worth of feature data from Rembrandt originals, the researchers managed to create a painting in Rembrandt's style which might have fooled even the most devoted Rembrandt aficionado ("The Next Rembrandt"). Two years later, in 2018, researchers at NVIDIA produced a generative adversarial model named StyleGAN (Karras, Laine, & Aila 2019) which caused a stir in the media for its remarkable ability to produce photorealistic images of people who do not exist ("GAN 2.0" 2018, Beschizza 2019). Moreover, unlike the standard generative adversarial networks on which it is based, StyleGAN allowed for a measure of control over the features of the images it produced so users could tweak the system to create bespoke synthetic images. The source code for StyleGAN became publicly available the next year. Two years later researchers at OpenAI announced DALL-E, and then a year later DALL-E 2 (Ramesh et al. 2022), transformer models based on the large language model GPT-3 which allow for even more control in the production of synthetic images: by mapping a space of text embeddings onto a space of image embeddings, DALL-E and DALL-E 2 enable users to produce novel images by simply entering a natural language description, including descriptions of style. There are now a variety of systems like DALL-E and DALL-E 2 widely available today, including Stable Diffusion and Midjourney.

These new AAMs are a link in a long history of the attempt to use machines to conquer the realm of creativity. There are many famous examples of AAMs in that history which have occasioned reflection on machine creativity. For instance, Harold Cohen's famous AARON (Cohen 1995), a mobile robot capable of autonomously producing line drawings and painting them, was one of the central subjects of Boden's (2009) philosophical reflection on creativity. Another was Karl Sims' evolutionary computer graphics (Sims 1991), which used evolutionary algorithms to procedurally generate a variety of 3D structures presented as works of art. AAMs also make a showing in other artistic domains like music. A famous example of a musical AAM was David Cope's EMI (Experiments in Musical Intelligence) which used a symbolic system with a set of production rules to produce novel classical music based on famous classical musicians' works. The works produced by EMI were so good that they managed to fool professional classical musicians on one occasion (Mitchell 2019). The updated version of EMI, Emily Howell, even managed to produce an album recorded by Centaur Records (CRC 3023 Emily Howell: From Darkness, Light). However, many of these earlier AAMs were designed specifically by their inventors to work in a particular style (for instance AARON was hard-coded to draw and paint in Cohen's style) or required substantive technical expertise to operate (for instance

Sims' programs required knowledge of evolutionary computing). Many recent AAMs like DALL-E and Midjourney mark a seachange in that they are not restricted in style and do not require extensive technical expertise.

As a result of this accessibility, there has been an explosion in the production of AAM art. Because AAM art has not yet achieved the institutional approbation or standing of traditional art they are rarely to be seen in art galleries. There are, of course, very notable exceptions, such as Refik Anadol's "Unsupervised" which made — and is still making, at the time of writing — a newsworthy showing at the Museum of Modern Art (MoMA, "Refik Anadol: Unsupervised). The place where much of AAM art is currently to be found is online on social media. For instance on Instagram, one can find thousands of such art associated with such hashtags as #midjourney, #midjourneyart, #aiart, #aiartcommunity. Questions about the creative value and agency of such art are already significant talking points. Many opinion and news articles have been written on the subject and continue to be produced apace. Indeed, such questions are as old as AAMs (Nake 2014). One of the most significant controversies so far involved an individual submitting a piece produced with Midjourney to a state fine arts competition and winning first place in the digital art category (Gault 2022), a development which significantly concerned many traditional artists and observers. Of particular concern in that episode was whether the individual who submitted the entry was its creator: could the person who submitted the work be legitimately awarded the prize if all he had to do was enter a prompt? Was he really the creative origin of the work? Again, these are not new questions. In a retrospective on various AAMs which had been employed over the period of 1980-1993, Nicholas Lambert, William Latham, and Frederic Fol Leymarie reflect on the issue : "One might justifiably question the artist's role in images that are not merely assembled by the computer in its capacity as a tool, but generated directly by it. Where is the human input?" (Lambert, Laytham, & Leymarie 2013, 371)

What is philosophically at the root of such quandaries about AAM art? One plausible answer is that such quandaries stem from the clash of the new possibilities of creation introduced by AAMs with certain traditional conceptions of the artistic process latent in much of our thinking. In particular, such works fragment² the traditional creative triad of vision, planning, and execution typically used to characterize the steps in artistic creation. In the common view, this triad is united in the efforts of an

² This fragmentation is only one instance of a larger conceptual fragmentation of standard aesthetic schemas which new computational technologies like AAM introduce into domains where they are applied. Luciano Floridi describes it as the "cleaving power of the digital" which "couples, decouples, or recouples features of the world—and therefore our corresponding assumptions about them—which we never thought could be anything but indivisible and unchangeable." (2017, 123) It is this "cleaving power" which necessitates conceptual reassessment and ostensible (re-)engineering of aesthetic concepts wherever such technologies appear.

artist (or artistic collective). It is the artist who sets the fine-grained representational parameters of the work they are going to produce, deciding what sort of "vision" they want the artwork to realize, even if they are commissioned to produce something in particular (ostensibly in this case the patron only provides loose-grained representational parameters). This vision might present as a mental image or it might be a desire to produce a work satisfying certain specified aesthetic ideas or it might be an aspiration to produce a work of art that represents or commemorates some idea or event. The vision sets the parameters of the form and content of the work of art. To realize this vision the artist must begin to make material choices about the composition of the work of art — this is the planning part of the triad. For many artists this ostensibly usually involves background research and decisions about what materials and canons of composition to employ in realizing the vision. The most prominent token of this stage is the preparatory study for the work ("How Preparatory Drawings Reveal an Artist's Creative Process" 2021), which involves experimenting with various ways of giving material form to the vision. Finally, the artist must apply their skill and technique to bring the final product to fruition — this is the execution part of the schema.³

We might use the composition of the "Mona Lisa" as a concrete example of how this triad apparently shows up in the artistic process (Cf. Zöllner 1993).⁴ The vision for the Mona Lisa was, on this view, ostensibly negotiated between Leonardo da Vinci and Francesco del Giocondo (husband of the depicted subject, Lisa del Giocondo), who commissioned the painting at the moment of commission. Leonardo was to produce a painting of Lisa suitable for what was possibly a new house and which would meet all the expectations of a portrait of its day. Among these expectations was that the subject must be idealistically represented as this was a standard expectation of portraits commissioned by wealthy patrons during the Renaissance. The planning involved detailed choices of how to meet this vision of a portrait with an idealized subject: for Leonardo this involved deciding, for instance, which time of day would be best to have Lisa model for the painting — to meet the expectation of ideality, Leonardo believed twilight would be a good time. The fact that the painting was commissioned for a new, possibly large, house also constrained the choice of scale and this also invariably informed Leonardo's planning for the painting. And finally the execution of the painting was consummated in Leonardo's painterly skill in the final product which now sits in the Louvre.

The human artists who use AAMs to make art do not conform to this schema of creative effort, or at least they conform to it in a manner so significantly different as to appear altogether divorced from it. Most significantly, they do not need to execute the works they produce. That part of the "traditional"

³ This brief outline is merely a sketch and leaves out a lot of detail.

⁴ All the subsequent information about the *Mona Lisa* is taken from (Zöllner 1993).

artistic process is very clearly done by the machine. Their planning is very different from traditional artists' as well. For instance, they do not need to apply, or even need to know, any of the canons of composition to produce their artistic objects, nor do they need to do any preparatory studies for their work. They may indeed spend time exploring different inputs to the AAM, but since the work is to be executed by the machine, they do not need to worry about the details of how to realize specific visions in the composition itself, the very details about which planning in traditional art is concerned. It is only with regards to vision that human artists who use AAMs might appear closest to traditional artists. These obvious differences lead the artists who work with such systems and who seem to buy into this schema themselves (although they see themselves as transcending it) to distinguish themselves from "traditional" artists in various ways. Most recently, this distinction has been made by the use of the name "prompt engineers" or "prompt designers" rather than say "digital artists" which is a term used by "traditional" artists working with computational tools which preserve the traditional triad of creative effort. The work of these "prompt engineers" is described in one way as touring the large (but finite) space of the image embeddings of the AI systems, selecting those that appear to have some artistic merit, and then polishing them (either by upscaling or digital "overpainting"⁵, for instance) to arrive at a refined product. All of this is not to deny that creating art with AAMs sometimes involves a lot of effort. Many prompt engineers spend a lot of time and energy fine-tuning their prompts to meet very specific artistic visions. This work sometimes involves so much effort that many prompt engineers even try to keep their prompts as proprietary secrets. Moreover, some (now somewhat out of date, but still contemporary) AAMs, such as StyleGAN require technical knowledge to be efficiently operated. In fact, manuals for prompt engineering have begun to appear — an example is the "DALL-E 2 Prompt Book" (dallery.gallery 2022) - emphasizing the fact that prompt engineering requires some form of effort and knowledge. However, it is clear that the structure of the effort involved diverges from the one conceived of in the traditional schema.

Such divergences raise questions about the applicability and relevance of the notion of creativity in the new conditions of creative production. This is the case even if we suppose that the traditional schemas were wrong-headed or too simplistic in the first place. In fact, it is precisely because that may be the case that such a conceptual reassessment is necessary. And *we do know* that traditional schemas like the creative triad just outlined above are only approximations of creative activity even in those cases where they seem to clearly apply. Even the Mona Lisa case used to exemplify the schema is too simplified since it took years from commissioning to final product to produce the painting (and even the final product was likely not the intended final product) over the course of which time the vision of the Mona Lisa

⁵ Upscaling involves using software to improve the resolution of an image and overpainting involves editing parts of the image manually (e.g. by changing colors or brushing out elements) or using elements of it to compose new images.

grew and changed significantly (as evidenced by multiple differing versions of it), often modified by exigences outside Leonardo's own imaginative representations so that it might be inappropriate to even talk about a "vision" more than of a compromise between these representational parameters and the exigences; the planning would have been so organic, dynamic, and experimental that it might be better to think of the final product as incidental than "planned"; the execution would have been done by Leonardo alongside a number of apprentices in his studio (and Leonardo might have only been minimally involved in the actual execution), etc. Outside the Western artistic tradition which might have fostered thinking of art according to this schema, it fares even worse. Think, for instance, about West African *jalilu* (griots) who are celebrated for their creative prowess but who largely regard their work as preservation rather than generation. Moreover, the history of art shows how traditional schemas of creative activity like the above have on occasion famously failed to make sense of some other innovations in artistic production prior to AAMs. To take an example at the heart of the moment described by Benjamin and Valery above: when photography first emerged, a debate almost immediately arose as to its status as an art, precisely because it also called into question aspects of the creative triad. Today, to question the status of photography as an art form would be moot and perhaps philosophically vacuous. As Walter Benjamin once put it, such a question would appear philosophically "confused" for photography did not simply appear as a new medium, but "transformed the entire nature of art" (Benjamin 1969[1936]) so that the very question was starting from the wrong place.

In short, the philosophical quandaries we face with AAMs plausibly rest in their clash with certain traditional schemas of creative activity. Even if we suppose these schemas to be confused and mistaken, we are still left with the task of saying just in which sense they are confused and which schemas of creativity might be more apt. Precisely what I have set out to do in this paper is to show that the answers to many questions about AAMs are "confused" and that to get them straight we must reassess and revise our conceptual landscape. To begin that task, it will be necessary to take a detailed prospect of that landscape.

Creativity: The Theoretical Landscape

In this section I provide a thematic overview of the philosophical and psychological literature on creativity, highlighting some of the key debates in the theoretical landscape. Most of this literature takes for granted that the term creativity "always expresses the same concept" and that it is the task of theories of creativity to fully account for this central concept (Paul & Stokes forthcoming). I believe that the debates surrounding attempts to account for this central concept are important to understanding some of the divergent conceptual purposes which get improperly fused into the

singular notion of "creativity", and thus also important to the task of splitting apart this undifferentiated concept.

We can begin this overview with debates surrounding the definition of creativity. A standard definition in both the philosophical and psychological literature is that creativity refers to the capacity to produce products or ideas which are novel and valuable (Boden 2009, Csikszentmihalyi 1996, Paul & Stokes forthcoming, Runco & Jaeger 2012). Although there is wide (but not unanimous) agreement on novelty and value as conditions on creativity, there is a lot of variability in how to define these conditions. Let us consider the debates regarding value first. For some theorists value is defined in terms of practical usefulness of the product or idea produced; for others it has to do with intrinsic merit; for others it meant economic value; and for others it has to do with whether some relevant community regards it as worth attention and inclusion in the domain of endeavor to which the product or idea belongs (Runco & Jaeger 2012 synoptically covers some of these divergences; the last definition of value is defended in Csikszentmihalyi 1996). For others, value should not be a condition on creativity at all since there are legitimately creative ideas or products which are not valuable according to any reading of value; according to some of these theorists value is incidental rather than essential to creativity (Paul & Stokes forthcoming). Connected to the issue of value is the issue of merit. How do we attribute merit for the ostensible value generated by creative products and ideas? Here as well, there are a variety of answers. One of the most prominent ideas is that since we do attribute merit to creativity, the processes underlying creativity must be intentional, and indeed require agency on the part of the creative individual (Stokes 2008). According to proponents of this agency condition merit attaches only to intentional production and "it would be conceptually confused" (Gaut 2010, 1040) to attribute creativity to non-agential systems, such as machines (Stokes & Paul 2021). This agency condition is opposed by some theorists of creativity (Arnheim 2001, Kauppinen forthcoming) and cuts against a widespread willingness to attribute creativity to apparently non-agential entities and processes (for example, natural selection (Beatty 2019)). An alternative account of creative merit which rejects the agency condition argues that creative merit accrues to plausibly non-agential capacities, such as spontaneous perceptual skill, which guide a system to produce a valuable product or idea (Kauppinen forthcoming).

Regarding novelty, one locus of disagreement is the question "novel for whom?" People, especially novices in some domain, often come up with products or ideas which are new to them but might not be new to others, especially to experts in the domain. This suggests that novelty is to be relativized. Margaret Boden (2009) makes a distinction between two kinds of creativity which captures this point. She calls P-creative any product or idea which is new to the individual who comes up with it if they have never been exposed to the idea or product, and H-creative if the product or idea is only for the

first time appearing in history. There is a theoretical rift about which of P-creativity and H-creativity is of primary theoretical importance, a rift which defines two approaches to thinking about creativity. The first approach, which we might call the internalist approach, which Boden herself favors, regards P-creativity as primary. This approach regards the study of the internal processes which underlie ostensible individual instances of creativity to be the primary target of explanation. Creativity, in this approach, is taken to be primarily a predicate of individuals and in particular of the cognitive processes which go on in these individuals. A second approach, which we might call the *externalist* approach defines creativity with regards to the situational context in which creative products or ideas emerge. According to theorists of this externalist bent, creativity is not a predicate which applies to individuals per se, but to sociocultural systems involving individuals and other components. For instance, in Csikszentmihalyi's systems model of creativity, creativity "does not happen in people's heads, but in the interaction between a person's thoughts and a sociocultural context." (Csikszentmihalyi 1996, 23). Creativity, on this account, is an emergent property of three interacting components: a domain, a field, and persons, to none of which individually creativity can be attributed. He defines a domain as a cultural region consisting of a "set of symbolic rules and procedures." For instance, mathematics, or any of its subfields, like algebra and number theory (ibid, 27-28). A field includes "all the individuals who act as gatekeepers to the domain" whose job it is to "decide whether a new idea or product should be included in the domain." (ibid., 28).

This theoretical rift between internalists and externalists can be seen as a disagreement on the responses to two related questions: first, to what (internal or sociocultural processes) does the predicate creative primarily apply, and, second, what kind of process is creativity? For internalists, as we have just seen, creativity applies primarily to persons and the cognitive processes which underlie their creative episodes. But the nature of this underlying process varies depending on which internalists you ask: For instance, for some internalists, creativity is a process of search through a conceptual space or the capacity to reorganize the conceptual space itself. This is a view widely endorsed by philosophers (for instance Boden 2009), psychologists (for instance Pike 2002), and computer scientists/AI engineers⁶ (for instance Chella et al. 2014) of an internalist bent. For others, the process involves generating plausible ideas and products and then exploring them with the aim of satisfying particular problem constraints — this is the process picture suggested by the highly regarded Geneplore model (Finke, Ward, & Smith 1992). Several other internalist models, such as Herb Simon's information processing model and the blind variation and selective retention model are also proposed (chapter 8 of Gilhooly &

⁶ Although ML researchers do not typically explicitly endorse particular theories of creativity, this conceptual space model is the most natural to ML systems because of the way they work (i.e. via the construction of high dimensional vector spaces). As mentioned earlier, recent work with AAMs has been described as a tour or search through these high-dimensional spaces using prompts to find images of artistic merit.

Gilhooly 2021 provides an overview). For internalists, then, the key desideratum of a theory of creativity is to explain the mechanisms which underlie the production of creative products or ideas. However, because of the famous messiness of creative cognition (Paul & Stokes forthcoming), the seemingly baroque variety of phenomena which are described as creative (Hospers 1985), and the notorious absence of full introspective access to the unfolding of creative episodes ("It came to me in a flash"), a challenge for internalists is to show how cognitive explanations of creativity can succeed, or as Boden (2009) puts it, how we can have a cognitive account of creativity without magic.⁷

For externalists, on the other hand, creativity applies primarily to the dynamics of sociocultural systems of knowledge/production. As a result, one cannot find a fixed process by which creativity is realized. To understand creativity, one must pay attention to the relevant domain and field which constitute the sociocultural context which interacts with persons to bring about new products and ideas. The dynamics of the system is historically and culturally contingent, so that an account of creativity must be responsive to particulars that reach out beyond persons and their internal cognitive processes. For instance, using his systems account, Csikszentmihalyi gives an account of the creative achievements of some of the Renaissance masters which includes the socioeconomic conditions of the Rinascimento, the historical rediscovery of Greece, the personal industry of some of the key artists of the period, the new artistic demands of patrons, etc. (Csikszentmihalyi 1996, 32) To an internalist, such details would be of secondary importance, but they constitute the primary data and explanantia to an externalist. The externalist does not neglect the contribution of persons, but sees them only as dispositive rather than constitutive causes of creativity. Csikszentmihalyi uses the following analogy to highlight this difference in the contribution of persons:

Perhaps being creative is more like being involved in an automobile accident. There are some traits that make one more likely to be in an accident—being young and male, for instance—but usually we cannot explain car accidents on the basis of the driver's characteristics alone. There are too many other variables involved: the condition of the road, the other driver, the type of traffic, the weather, and so on. Accidents, like creativity, are properties of systems rather than of individuals. (ibid., 45)

Thus on this account even though persons are constitutive of the systems in which creativity is realized, there need not be any underlying property attributable to them which realizes a creative episode. Consequently, unwitting or accidental discoveries on the part of persons can play a part in creativity

⁷ Some theorists suggest that such explanations are unlikely to be produced. Following Kauppinen (forthcoming) I will call these theorists "exceptionalists".

according to such accounts, a claim which is routinely rejected in the literature (Stokes 2008). A primary difficulty for externalists is how to escape the charge of attributivism, namely making creativity a property of the attribution of particular communities rather than the ostensibly more robust and objective phenomenon it ostensibly is.

So far we have been looking at some of the theoretical divergences that exist around three definitional themes in the literature: value, merit, and novelty. One final theme from the literature is worth looking at and will be of importance later in this paper: the benefits of creativity. Often neglected in theoretical accounts of creativity are the many benefits empirically attributed to creative activities. Many of these benefits are of the kind we might term existential; they include an improved sense of a meaningful life and life-satisfaction (Hickson & Housley 2006), happiness (Tan et al. 2019), mitigation of depression associated with aging (Flood 2006), and consolidation of identity (Barbot et al. 2021). Thus it appears plausible that creativity has an existential function which ought to be accounted for in a theory of creativity. However, with the exception of cognate but distinct discussions about whether creativity is a virtue and the motivational structure of creativity (Paul & Stokes forthcoming), this question is rarely raised in the literature. There are a few isolated exceptions: for instance, Kharkhurin (2014) argues for authentic self-expression as a constitutive criterion of creativity. Another exception is (Kaufman 2018) which develops a model synthesizing creativity and existential meaning. From one perspective, the theoretical neglect is easy to understand: whatever benefits accrue to creativity could be treated as consequent rather than essential to creativity itself. This is the path most of the literature takes.

This concludes my thematic overview of the literature on creativity. What emerges from this overview are some of the "fundamental criterial disputes running through analytical work on creativity" (Shevlin 2021, 16). As Paul and Stokes (forthcoming) summarize the issue:

...even after we fix a specific referent for the term "creative" – whether it be a person, process, or product – there are lively disagreements about what it means. These debates often seem to presuppose that the term always expresses the same concept, for which we can seek necessary and sufficient conditions. But we've also seen that some theorists distinguish between different concepts of creativity, corresponding to different senses of the term 'creative'. In future work we may see theorists develop such pluralistic approaches in more detail. The trick, though, will be to give principled reasons for multiplying different concepts of creativity so that the analyses do not simply reduce to saying that anything goes.

I now want to suggest that we can discern from the themes that have emerged from this overview at least three conceptual purposes uneasily welded together into the singular undifferentiated concept of "creativity" which the literature presupposes, supporting the need for precisely the sort of pluralistic maneuver indicated by Paul and Stokes. Briefly, these three conceptual purposes indicate what I will call the *institutional, scientific*, and *existential* concepts of creativity.⁸ In the next section I will define each of these concepts of creativity and connect them to the relevant themes from the literature and then employ them in making sense of the issue of machine creativity. My argument for pursuing this sort of pluralistic maneuver is pragmatic: a stalemate is clearly discernible around the conceptual analysis approach to the question of machine creativity and creativity more generally. I believe that such a stalemate suggests that the concept in question might be defective, and thus requires revision or replacement with new concepts altogether. My approach here is, as suggested in the introduction, precisely an attempt to perform a variety of revisionary conceptual analysis in order to cure this defect and make progress on some of the relevant questions. In the next section, I disentangle the just mentioned three concepts of creativity and put them to work in answering one of the most prominent of these question speaks for them as useful revisions of the classical concept.

4. Are Machines Creative?

In this section I define these concepts of creativity disentangled from the undifferentiated classical concept and employ them in making sense of the issue of machine creativity.

4.1 Institutional Creativity

The institutional concept of creativity emerges at the intersection of the themes of value, novelty, and merit. This concept of creativity is the relevant concept for understanding the incentive structures of creative institutions and the grounds of credit allocation for innovative output valued by those institutions. *A product, idea, or system is creative in this sense just in case there are institutional standards or criteria by which we may attribute merit to it for the value and innovation it brings to the domain with which the institution is concerned.* There is no one size fits all criterion of institutional creative in this institutional, sense, standards which vary necessarily because institutions value different things and measure novelty by different standards. What the Museum of Modern Art might regard as creative and thus meritorious will differ from what the Uffizi would regard as such because they set different standards. What a high school art fair would regard as novel will differ necessarily from what

⁸ These three disentangled concepts of creativity are not intended to be exhaustive. The classical concept might contain other conceptual purposes fused into it.

an established national art museum would regard as such. To take a more detailed example: each year the Vilcek Foundation awards the Vilcek Prize for creative promise⁹. The prizes are awarded to people working in "The arts and sciences" which the foundation regards as "creative endeavors, constantly evolving and influencing our society." The criterial characteristic of potential awardees, which follows from this view of creativity as a transformative endeavor, is that their work should contribute to the "advancement of culture for all of us" (Vilcek Foundation: Our Mission) For the Vilcek Foundation creativity is defined in terms which make contribution to the progress of society criterial. On the other hand the London Mathematical Society awards the Polya Prize "in recognition of outstanding creativity in, imaginative exposition of, or distinguished contribution to, mathematics within the United Kingdom." ("LMS Pólya Prize") Though the award has sometimes been given to people whose work have had practical applications which can be said to drive the progress of society, it can, and has been awarded for work which had at the time of award no known practical application and which thus could not have been selected on the grounds of contribution to societal progress, except if such progress is measured in the small domain of theoretical advances in Math. Nevertheless both institutions are justified in their judgments about creativity because institutional creativity is determined by institutional values.

In short, no particular institutional standard defines what creativity is, but the instances of creativity every standard picks out, if the standard is coherent and aligned with the institution's values, are all instances of (institutionally) creative products or ideas. Furthermore, different institutions can vary as to their target of ascription of (institutional) creativity — the Nobel Prize for Literature is awarded to authors and to the extent that judgments of creativity figure in any award, it is the *author* that is judged to be creative, while the Pulitzer Prize is awarded to particular works; to the extent that judgments of creativity figure in the awards, it is the *work* that is creative. Neither of these targets of ascription of creative merit defines what the "true" target of creative merit is (indeed, there is no such "true" target independent of the institutional criterion).

Moreover, because the values and standards of institutions are up for negotiation, institutions can expand (or new ones can form). Among the reasons such expansions or formations of new institutions might occur is to accommodate new forms of creative possibility. As mentioned above, when photography first arrived on the scene there was a debate about its status as a creative medium. Today you can see photographs in museums and can go to museums dedicated to photography. And indeed, as Walter Benjamin remarks, in retrospect "The nineteenth-century dispute as to the artistic value of painting versus photography today seems devious and confused." (Benjamin 1969[1936]) And

⁹ The award is restricted to US immigrants.

elsewhere, he adds: "Earlier much futile thought had been devoted to the question of whether photography is an art. The primary question – whether the very invention of photography had not transformed the entire nature of art – was not raised." (ibid.). The transformation of the nature of art occasioned by photography is precisely what I would describe as the expansion of the institutions and genres (and the formation of new ones) of art to accommodate the new creative possibilities of photography.

The episode concerning photography parallels contemporary arguments about the artistic value of AI art and thus gives us a good entry into the question of whether machines are institutionally creative. Are they? The answer to that question is just Benjamin's description of the photography case: the question is "confused" without the further specification of what institutional context we are concerned about. To answer the question in the negative outright is to deny that there could be novel institutions (for instance a Museum of AI Art) which caters to AAMs or that our current institutions could evolve a genre of AI art as they evolved a new genre for photography or for readymade/found object art, for example. There are no hard constraints on the constitution of institutions which prevent AAMs from being accommodated, or at least no one has yet pointed out such constraints. Indeed, from a certain structural perspective, some now accepted categories, like readymade/found object art, are equivalent or near-enough equivalent to AAM art; André Breton once defined readymade/found object art "manufactured objects raised to the dignity of works of art through the choice of the artist." (cited in Iversen 2004) Thus even if we were to insist that AAMs "manufacture" rather than agentially produce art, their interaction with prompt engineers who choose which of their outputs to present as art, suggests that they could on this definition be regarded as creative products analogous to readymade/found object art. Like Hilbert's Grand Hotel, room can indefinitely be made for newcomers in the house of creative possibility.

Everything said so far only suggests that there is no principled reason to think that AAMs are not institutionally creative. But on the ground things might be more complicated — there might be a greater difficulty in the expansion of institutions required to fully accommodate AAM art. There are a variety of reasons, all sociological, for this. One of these has to do with how institutions constitute themselves. To wit, institutions which support creative work thrive on a number of narratives, one of the most significant of which is the narrative of the selectiveness and/or relative scarcity of the kind of creative value they curate. Art museums, for instance, tend to be valued for how choice their selections are. But AAMs like Midjourney or DALL-E undermine this narrative somewhat since anyone can now produce their own work of art with these systems without the sort of expertise or skill which makes museum works choice. To adapt another description from Walter Benjamin "the distinction between author and public is about to lose its basic character" (Benjamin 1969[1936]) in the age of AAMs. As

such, institutions might be more hesitant to expand to capture AAM art because they undermine a significant narrative by which many traditional art institutions constitute themselves. But this democratization might also be the salvation of AAM art since the move towards decentralized democratic Web 3.0 institutions might foster a new generation of institutions which can accommodate the art-on-demand character of AAM art, as suggested by the strong presence of this sort of art online.

Another narrative which sustains most contemporary creative institutions and might make institutional acceptance of AAMs difficult is the narrative of "mastery". Ostensibly, the reason why the works currently in art galleries are in the galleries is because they evince a mastery of the form of which they are a type. The narrative of mastery is peopled by such characters as the Dutch Masters, the Old Masters, Unknown Masters, etc and serves to mark in another way the institutional approbation granted to certain works. Perennially in the history of art we find this narrative maintaining its authority even in the face of disruptions of new media and forms whose capacity for sustaining mastery, precisely because of their novelty, has yet to be tested. E.H. Gombrich gives excellent expression to this situation, writing:

"New conditions, new problems, new media, and new topics are bound to disrupt the old skills and demand new habituation both on the part of the creators and on that of their public. We must hope that opportunities for mastery will always arise, but we cannot be sure, and we must let the future look after itself." (Gombrich 1979, 161)

It is still early days for AAMs and it appears many institutions are skeptical that the new media, with prompt engineering as its locus of effort, makes sufficient room for mastery and distinction in skill. This is understandable since it is not clear at present that prompt engineering is an activity with sufficient internal complexity to sustain the sort of opportunities for mastery that, according to Gombrich and others, is at the heart of art as currently institutionally conceived. Nevertheless, "we must let the future look after itself".

It is worth noting by way of conclusion that the properties which characterize the concept of institutional creativity are at least in part the properties to which externalist accounts of creativity appear to be sensitive. But rather than suppose that these properties constitute creativity *tout court*, I contend that it is only one of a variety of independent notions that have been collapsed into the singular undifferentiated concept.

4.2 Generative Creativity

A second concept, generative creativity, is the concept which is concerned with the mechanistic structure of generative thought; it is central to our scientific understanding of the generativity of cognition and the nature of intelligence and is at least in part the notion of creativity which internalist accounts of creativity appear to be sensitive to, but again I contend that it is only one of a variety of independent notions that have been collapsed into the singular undifferentiated concept. *A system is regarded as generatively creative (or simply "generative") just in case it can produce "new thoughts from old ones" (Boden 1977, 298).* Call this ability to generate "new thoughts from old ones" *generativity.* There is no further qualification. The word "thought" here should be taken broadly to refer to an output or internal representation of some relevant kind. So, for instance, although we might shrink from attributing thought to DALL-E 2 or EMI, we can regard them as producing "new thoughts from old" because the output they produce at runtime are identifiably distinct from the items in the database on which they are trained.

To be sure, there can be questions about whether two systems are generative in the same way. Such questions can be read in two ways. First, we might be asking about whether the processes by which the two systems generate new thoughts from old ones are mechanistically similar. Second, we might be asking about the kind of generative processes which can be realized in different systems. This latter question is a variation of the former which arises when we have a taxonomy at hand for classifying the varieties of processes involved in generative processes. For instance, a commonly-invoked taxonomy identifies three kinds of mechanistic processes underlying the ability to produce new thoughts from old: combinatorial, exploratory, and transformational processes (see Boden 2009 for a detailed review of these processes). Since there are no a priori bounds on what mechanistic structure a system must conform to if it is to produce new thoughts from old ones, the answers to both questions cannot be grounds for ruling out a system as generative as long as the system can indeed produce new thoughts from old. If a system is indeed able to produce new thoughts from old ones that is sufficient to make it generative. It can simply be generative in a different way than another system if their generative mechanisms (or the kinds of generative processes they can realize) differ. Unfortunately, even though there are no a priori bounds on what kind of mechanistic structure is required for being generative, an a priori standard is typically set using human cognition as a norm. There is nothing wrong with setting such a standard if our research question is whether machines are generative in the same way as humans, but such a standard is no grounds for adjudicating the more general question whether machines are generative simpliciter, and certainly no grounds for judging whether machines are creative tout court. This is because generativity is not defined in terms of any particular standards besides the simple criterion of whether a system can produce new thoughts from old, and being creative tout court relies on the undifferentiated concept of creativity which runs together distinct notions.

When in speaking of AAMs we speak of them as "computer models of creativity" (Boden 2009), it is generativity that we have in mind. AAMs are models of creativity in the sense that to the extent that they are engineered simulacra of a phenomenon of cognitive-scientific interest, namely the capacity to produce new thoughts from old, they could be used to understand and explain the phenomenon. They can, in other words, serve as informative surrogative representations of natural instances of such generative cognition, and such informative surrogative representation is definitional of models (Swoyer 1991). But of course even if they can be employed as models of creativity, both historically and contemporarily, most AAMs have not been built with this surrogative goal in mind. They have typically been built for explicit artistic purposes. So even though their successes as generative systems might serve as an indication, contra exceptionalists¹⁰, that there is the possibility of a scientific explanation of generativity, AAMs have for the most part only incidentally served as models.

This is particularly true with recent ML-based AAMs. Many of these AAMs are designed by organizations whose aims are predominantly practical and only tangentially scientific. As such while we may recognize them as generative to the extent that they are generative, we might suppose that they are bad models of creativity if we are concerned with the particular ways in which generativity occurs in humans. Indeed, a recent analysis of DALL-E 2 (Marcus, Davis, & Aaronson 2022) reveals systematic failures in the system which suggest that while a practically very useful tool for artistic purposes, it is not a good representation of human generative cognition to the extent that the systematic failures are not evident in human cognition. For instance, the authors showed that some of the images produced by DALL-E 2 demonstrate that the system has difficulties with, inter alia, compositionality, anaphora, number comprehension, understanding negation, and common sense. To the extent that these difficulties are not characteristic of human generativity does not mean DALL-E 2 is not generative, it only suggests that if it is generative, it is so in a different way. And as I have suggested above, DALL-E 2 can produce new thoughts from old, and so it is generative, only in a different way than humans.

¹⁰ See fn. 7.

¹¹ However, we must exercise caution in making such an inference for two reasons. First, even if we accept that these difficulties are not a feature of human cognition, it is an open theoretical question whether they are relevant to judgments specifically about the generative capacities of AAMs. It is possible for an AAM to have these difficulties and still be capable of producing new thoughts from old very well. Indeed, the authors of the DALL-E 2 analysis confess that "DALL-E 2 is unquestionably extremely impressive in terms of image generation." (Marcus, Davis, & Aaronson 2022) And second, it has recently been argued that such problems might simply be performance constraints having to do with material differences in humans and machines which mask deep-lying similarities of competence (Firestone 2020; see also Buckner in press).

4.3 Existential Creativity

There's an existential current to the classical concept of creativity as we saw in the thematic overview. The third concept of creativity I distinguish in this paper, which I call the existential concept of creativity, is about this current. As we saw, creative activities¹² are associated with a variety of existential benefits which are rarely incorporated into accounts of creativity, although there are exceptions. This existential current has several dimensions, some of which have already been highlighted above. Mihaly Csikszentmihalyi suggests other dimensions: creative activities are also a way "To bring order to experience, to make something that will endure after one's death, to do something that allows humankind to go beyond its present powers are very common themes." (Csikszentmihalyi 1996, 38) This realization of what I am calling the existential value of creativity emerges from Csikszentmihalyi's studies of creative individuals and is dramatized, for instance, in this account he gives of the poet György Faludy:

When asked why he decided to become a poet at the age of seven, György Faludy answered, "Because I was afraid to die." He explained that creating patterns with words, patterns that because of their truth and beauty had a chance to survive longer than the body of the poet, was an act of defiance and hope that gave meaning and direction to his life for the next seventy-three years. (ibid.)

It is easy enough to multiply, from the annals of creative history, such examples of this dimension of creativity. A catalog of the existential faces of creative activity could grow interminably long; apart from the ones we have already seen we could add several others: conditioning eudaimonistic states¹³, a means of understanding life itself, or managing difficulties like solitude, etc.

While it is true that all of these existential faces of creative activity can be treated as incidental rather than constitutive of creativity (as much of the philosophical and psychological literature takes it to be), it is clear that they are a paramount feature of creative activity. Indeed so significant are they that, as some of the examples above demonstrate, they form an inalienable and virtually definitional part of the understanding of creative activity for most of those engaged in it. And so even if we follow much of the literature in treating the existential benefits of creativity as ancillary, we must still recognize the significance of this component of creativity. I believe we can tease out from this thematic component

¹² By "creative activities" I just mean the class of activities which are paradigmatically associated with attempts to produce novel products or ideas, such as making art.

¹³ Consider, as example, Glenn Gould's (1984, 246) assessment of art (the paradigm of creativity activity) in the essay *"Let's Ban Applause"* as "the gradual, lifelong construction of a state of wonder and serenity."

what I will term the existential concept of creativity, which again I contend is only one of a variety of independent notions that have been collapsed into the singular undifferentiated concept. The existential concept of creativity is in short the concept which revolves around the function of creative activities as a source of existential value. *A system is existentially creative just in case it derives existential value from creative activities*.

Machines do not have existential lives (I take this point for granted). So machines are not creative in this sense since they cannot derive any existential value from creative activities. Nevertheless machines do have an influence on people's existential appreciation of creative activity and thus they are relevant to understanding the existential concept of creativity. One significant example of this influence is the discourse on the future of art which has been generated by the use of AAMs. Many people have been concerned that AAMs devalue the existential value of creative activity and the products that result from them and so sound a death-knell for art. At the beginning of her book on AI, Melanie Mitchell (2019) tells a story of Leonard Hofstadter's experience with EMI which demonstrates this concern. Hofstadter, after playing a mazurka in the style of Chopin composed by EMI found himself "troubled" that a machine could compose something like that, even if it wasn't perfectly like Chopin, and reflecting on how the relatively simply mechanical rules which constituted EMI could create music (a domain long seen as a stronghold of human creativity, a true expression of the human self) which significantly resembled the work of a human composer. Later Hofstadter's concern is compounded by an experiment he carries out: he has a pianist play an EMI Chopin-style mazurka and a real but little-known Chopin mazurka to an audience at Eastman School of Music which included "several music theory and composition faculty" and asks the audience to judge which of the two pieces was the real Chopin and which was EMI. The audience selected the EMI composition as the real Chopin. Hofstadter describes his reaction: "I was terrified by EMI. Terrified. I hated it, and was extremely threatened by it. It was threatening to destroy what I most cherished about humanity." (Mitchell 2019, 10). In his own writing Hofstadter summarizes the source of his terror as follows: "The idea that pattern manipulation of the most superficial sort can yield things that sound as if they are coming from the human being's heart is very, very troubling." (Hofstadter, cited in Mitchell 2019, 9). In popular media one finds the entire gamut of conceivable responses to such concerns, from a deep moral panic about this existential (and, not entirely divorced from that, economic) ramification of AAMs to a fatalistic concession and welcome of the "robot overlords". A particular instance of the former culminated in a strike in Hollywood while a case of the latter is dramatized by the popular musician/artist Grime's gleeful forecasting of the "end" of human art.

I call this sort of concern the "trivialization discourse". I believe that the trivialization discourse is seriously flawed, but this paper is not the occasion to challenge it in detail. Ultimately, whether or not

the discourse is justified undermines neither the importance of the existential concept of creativity nor the claim that machines are not creative in this sense. The discourse is a sociologically contingent development and is orthogonal to the empirical and first-person evidence of the existential value of creative activities which grounds the existential concept.

5. Conclusion

I began this paper with the observation that AI systems call into question many of our classical notions in the domains in which they are applied. In particular, I observed that AAMs call into question our classical notion of creativity, as manifested in some of the difficult questions that arise when we try to use the classical notion to make sense of them. My principal aim was to use this observation as an occasion to carry out a revisionary analysis of the question of creativity and then use the revised concept to answer some of these difficult notions. The case of creativity is only one among a host of concepts called into question by AI systems and AAMs in particular. Other concepts have already been analyzed (e.g. the concept of authenticity by Floridi (2018)), but many others remain to be assessed in light of changes wrought by such systems. AAMs and AI more generally provides a philosophical occasion for a project in revising some of the fundamental concepts we have heretofore uncritically inherited and I hope philosophers will seize that occasion.

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