AI, Creativity, and Imagination

Abstract

This paper considers the verdicts that different philosophical analyses of creativity give in answer to the question 'Can AI be creative?', focussing in particular on AI music generators (AIMGs). We first look at the standard definition of creativity ('novel and valuable') and at variations on it from Boden, Gaut, and Brainard. We then consider Hills and Bird's non-standard view which makes imagination central to creativity. While the standard version give an unequivocal 'yes' to the question of AI creativity, the additional conditions proposed by the variants of the standard view are prima facie more difficult for AI to meet. Nonetheless, we find that either these additional conditions are met by actual or easily possible AIMGs or, where those conditions are not met by AIMGs, they are not conditions that even human creativity satisfies in every case. The non-standard view's imagination condition makes AI creativity rather less plausible. We conclude with reflections on the significance of the question of AI creativity.

Keywords

AI, Creativity, Imagination, AI Music Generation

1. Introduction

Uses of AI in the arts to generate new works is increasingly familiar. So a natural question is this: Are those AI models being creative in producing those outputs? This paper addresses that question, focussing in particular (but not exclusively) on the case of music, where AI music generators (AIMGs) are producing outputs of some commercial value and are replacing human composers for some purposes. The answer to our question depends on which account of creativity one adopts. The basic version of the standard view of creativity—which takes creativity to be a disposition or ability to produce novel works of value—gives an unequivocal answer *yes* to the question. More elaborate versions of the standard view add further conditions. These conditions are either also met by actual AIMGs (or by AIMGs that could easily be developed), but this is less obvious and requires some argument. Or those conditions are not met by AIMGs—but they are not conditions that even human creativity satisfies in every case. A more recent, non-standard view of creativity takes creativity to involve the exercise of the imagination to produce novel works. This view thus pushes the question on to whether AIMGs have the capacity to imagine.

1.1 What is AI music generation?

The outline of the history of AIMGs follows that of artificial intelligence in general. Early applications of AI in music, which date back to the 1950s involved computer composition by algorithms incorporating explicit compositional rules, as well as use of stochastic and search-based methods operating over symbolic musical representations.[1]

While data-driven and statistical methods in computer composition have a longer history, deep learning employing neural networks became increasingly prominent in music from the 1980s and 1990s. The outputs were still limited to musical phrases, with anything more sophisticated requiring human involvement in the composition, either by direct curation or in setting rules for recombination and structure. The 2010s saw significant advances, using the technological advances of Recurrent Neural Networks (RNNs), especially LSTMs (Long Short Term Memory networks), aided by larger datasets and increased computing power. Google's Magenta encompassed several important models that enabled longer phrases and polyphony, producing outputs with more convincing stylistic imitation.

This core of this technology involved using the datasets to generate a probability distribution for upcoming musical events (such as a note's pitch, duration, dynamics, etc.). For example, if the training set consists of pop hits of the last thirty years, and if the AIMG has as input (or has itself already generated) the sequence of notes G - B - D then it will regard the note C as much more likely to be the next note than A♯. The model will sample from this distribution, using various parameters to vary the balance between variety and predictability. Typically, the learning material is accompanied by metadata providing information about artist, style, and so forth, which will allow the AIMG to make predictions on the basis of the relevant genre when so requested.

The next breakthrough came after 2017 with *transformer* technologies. While the earlier technology could produce plausible short musical phrases, transformers allowed the models to take into account a much larger and richer set of contextual information to produce longer passages of music (although it should be noted that the production of large-scale structure, involving repetition and development of musical ideas or contrasting sections, remains a challenge). Furthermore, whereas previous systems typically worked with MIDI or similar symbolic representation of notes (the electronic equivalent of a musical score notation), transformer-based models also worked with non-symbolic representation of sounds, such as spectrograms. This enables the production of audible music as outputs, not just musical scores. Correspondingly, the role of the human moved from composing with AI to overseeing the production of music, with the introduction of text prompts. The leading

[1] An early example is Hiller and Isaacson's *Illiac Suite* (1957) and a later example is Ebioglu's CHORAL (1990). The former is a composition constructed out of computer-generated outputs obeying a simple set of compositional rules, the complete work being put together by human editors. The latter is a programme that encapsulates hundreds of rules of harmony and counterpoint that will produce a (very effective) harmonization of a given melody, in the style of J. S. Bach, with no further human input.

products of this era included MuseNet, Jukebox, and AIVA. Increasingly these models engaged in self-supervised pre-training, whereby the model picks up similarities between the training samples without those similarities being labelled in the metadata. Thus the model can itself see that Bill Haley and Jerry Lee Lewis are more similar to one another than they are to Chuck Berry and that Elvis has similarities to all three. That can be used in weighting the predictions the AIMG makes—for example if prompted to produce music in the style of Jerry Lee Lewis.

A common use of AIMGs is to produce short music samples that may be used as soundtracks for advertising or social media videos, such as on TikTok—without having to employ or pay royalties to a human composer. Another use is to create ambient music suited to a user's mood. However, increasingly AIMGs are being used to produce complete new works. The current generation of AIMGs, which include Suno AI, Udio, and Soundraw, are able to produce finished songs, which can include recreations of the voices of actual singers, starting from a text prompt such as 'Indie folk song with soft female vocals and acoustic guitar', or 'Orchestral track building tension, suitable for a trailer for an action sci-fi movie'. More involved prompts tend to produce more interesting results: 'Upbeat country music song in the style of Dolly Parton, about returning home after a long road trip. Instrumentation should include banjo and harmonica . . .'

The quality of AI generated music is constantly improving. With judicious human input (which no longer need include any technical musical knowledge), the results are often more than passable. Just as we have seen ChatGPT and its competitors continually improve, we can expect such AI music generators to produce music of increasing artistic quality, even with minimal human contribution. We will assume in what follows that AIMGs are able or will soon be able to produce music that some people will want to listen to for its own sake, music of a quality such that had it been produced by a human, we would be inclined to say that the human is creative. In the light of this production of new, high quality music by AIMGs, we may ask whether in producing these pieces, AI could properly be said to be *creative?*

1.2 What is it to be creative?

The standard view of creativity takes it to be a capacity to produce new works that (i) are novel, and (ii) have value. Variations within the standard view may add further conditions. Margaret Boden (2010), for example, adds the condition that the works should be *surprising*, while Berys Gaut (2010) proposes that in addition the works should be produced by *flair*. We mention also the proposal from Lindsay Brainard that creativity requires that the creative output disclose the identity or values and commitments of the creator and that it results from their curiosity. There are variations also in what counts as 'valuable'. Some authors talk of 'usefulness' whereas others talk of beauty.

A recent non-standard view of creativity rejects the standard view's requirement of value. According to Hills and Bird (2018, 2019) creativity is the capacity to produce works that (i) are novel, and (ii) are produced be exercise of the imagination. They add two further conditions: (iii) the creator should have some degree of fertility in producing such works, and (iv) they should be motivated to bring those works to fruition.

In the discussion that follows we shall compare the standard view and its variants with the non-standard view. We will see where the views differ regarding whether they attribute creativity to AI, and if so why, and also in their reasons regarding why it matters whether AI is creative.

2. The standard view of creativity with regard to AI music generation

2.1 The minimal version of the standard view

We will now see what the two views of creativity say about the possibility of AIMG creativity, starting with the standard view. The standard view, like the non-standard view, holds that creativity requires the novelty of the creative outputs. Do AIMGs produce novel outputs? Clearly they do.[2] Currently, with minimal prompts, their outputs are typically very derivative, so their degree of originality is low. But the outputs are new in that they have not been produced before. Indeed, the very point of many AIMGs is to produce music for use in advertisements and other video material in a way that does not require the user to pay royalties—which they would be obliged to pay (to some human composer) if the music was not strictly novel.

The standard view requires in addition that the works have value. While the aesthetic merit of music produced by AIMGs with minimal human involvement is not yet very great, the quality of AIMG outputs is improving. In any case, the value condition for creativity is normally understood to be quite weak. It is sufficient if the product of creativity has some kind of value in some respect, which includes being valuable in some way for the person producing it. So, if AI music can be used in advertisements or in videos, it plainly has value for some people, if only the advertisers and video makers. It is not normally part of the standard view that creativity requires the produced works to have significant aesthetic value—or any specifically aesthetic value at all—even when the product is presented as a work of art. So even if we regarded the music produced by AIMGs as 'AI slop' of no aesthetic value, it could still meet the value condition of the standard view of creativity.

Thus both the core conditions of the standard view are met by AIMG. The novelty and aesthetic value of the outputs are not yet very significant, but that is changing. We will later

[2] Unsurprisingly, ChatGPT is in thrall to the standard view of creativity. When asked 'Do AI music generators possess creativity?' ChatGPT 4o tells us, among other things: 'AI Creativity: Refers to the AI's ability to produce outputs that are perceived as novel and valuable' (accessed 2024/07/29).

ask whether there limits to what AIMG can achieve, but if there are such limits, the technology has not yet reached them.

2.2 Extended versions of the standard view—Boden and surprisingness

The further requirements that some authors add to the two core conditions may be more difficult to meet. We saw that Margaret Boden requires that creative outputs are surprising, not merely novel.

Boden (2010: 31) identifies three kinds of surprisingness and three corresponding kinds of creativity. The most basic kind of surprisingness is a matter of being merely unfamiliar or improbable. This may differ from mere novelty, in that something may be novel but so similar to something familiar that it is itself not unfamiliar. Creativity that exhibits a kind of surprisingness that goes beyond the novel but familiar, Boden calls *combinational* creativity. The second type of creativity is *exploratory*, involving an exploration of an existing conceptual space, where an idea is surprising in that one did not realise that this was a possibility within the conceptual space. Ideas exhibiting the third kind of creativity, *transformational* creativity, are surprising because they would appear to be impossible given the existing conceptual space. An example of transformational creativity within music might be the development of atonal classical music by Schoenberg, Berg and Webern, which strikes most as a significant break from the preceding classical tradition. Transformational creativity is very rare, as Boden herself acknowledges. And it is worth emphasizing that even the most admired creative artists are not all transformationally creative. Mozart is to many the paradigm of a creative genius. Musical ideas flowed freely from him, and he wrote many works of great aesthetic value. But he did not significantly transform musical conceptual space: he worked within the classical genre. Therefore he was not transformationally creative.

The typical AI output, even if strictly novel, is highly derivative. The training on existing works makes a high degree of surprisingness unusual. But far from impossible. Random variation and the quantity of such work will mean that some it will have a sufficient degree of novelty to be surprising, and thus exhibit combinational creativity.

AIs can exhibit exploratory creativity too. AIs can identify patterns in data that we have not spotted, and so can produce ideas that are less familiar to us. Perhaps AlphaGo's move 37 is the most famous instance of a surprising idea from an AI. Move 37 counts as a creative idea according to Boden's criteria: it was novel; it was valuable (it won AlphaGo the game against Lee Sedol); and it was surprising in both of Boden's first two senses. There are instances in music also. François Pachet's Continuator is an AIMG that will listen to a performer's playing and respond in the same style, generating an improvised musical dialogue. Musicians report that the results are surprising, not just because the Continuator's musically very plausible responses are recognizably in their style but also because the responses are often ones that the performer would not themself have come up

with. Holly Herndon, with Mat Dryhurst and Jules LaPlace, created the AIMG Spawn, with which they co-created the album *Proto* (2019). *Proto*'s tracks go beyond competent imitation to include new—and surprising—sound-worlds that have been received with critical acclaim. For example, her track 'Godmother' was based on input by Jlin, but, as Michael Appouh (2019) writes, 'The result doesn't exactly reflect [Jlin's] work but instead interprets, twists and dishes out rough chops of noise—somehow mimicry finds independence.'[3]

Whether AI can show transformational creativity is more difficult question. It is certainly hard to see how an AI trained in a conceptual space, could develop an idea that appeared to be impossible given that conceptual space. It is fair to say that the music produced by current AIMGs is not surprising in this sense, and so they do not yet appear to be capable of transformational creativity.

However, it is not clear that it is actually impossible for an AIMG to exhibit transformational creativity. In particular, as we have noted, AIs are trained on vast quantities of data, more than humans typically ever encounter, and they are known sometimes to find patterns in those data that are not at all obvious to us. An AIMG that found such a pattern and extended it to produce new music could thereby produce a work that was really very surprising to us. Often these new works will have only parts that are very surprising, rather than the whole being radically new, and typically, the surprises are likely to strike us as 'mistakes' rather than as new and fruitful directions for music. Nevertheless, it does not seem impossible in principle for AIMGs to produce new works that strike us as surprising in the transformational sense, though as noted, they do not yet appear to do so in practice.

It might be responded that an AIMG cannot produce truly transformational work, since AIMGs are inevitably trained on previous works, so they must of necessity be derivative of them and take on their conceptual schemes. But, of course, human composers always draw on previous works, even as they transform the musical conceptual space. For instance, it is widely recognized that Schoenberg and Berg drew on chromatic and atonal elements in earlier works by Wagner, Mahler and, Strauss but they developed these ideas in a much more sustained and uncompromising fashion while also developing contrapuntal and structural ideas from Bach.

In short, AIMGs are certainly capable of combinatorial creativity and can exhibit exploratory creativity. Whilst it is unlikely that, without human prompts or other input, they will ever produce any music of great value through transformational creativity, this cannot be ruled out in principle.

[3] For 'Godmother' see URL: https://www.youtube.com/watch?v=sc9OjL6Mjqo (accessed 2026/06/03).

2.3 Extended versions of the standard view—Gaut and flair

Berys Gaut (2010: 1041–2) proposes that the work be produced by the exercise of 'flair', a term that he uses as a shorthand for the following abilities:

> [to] exhibit at least a relevant purpose (in not being purely accidental), some degree of understanding (not using merely mechanical search procedures), a degree of judgment (in how to apply a rule, if a rule is involved) and an evaluative ability directed to the task at hand.

2.31 Gaut and flair—purposiveness and understanding

Let us consider these in turn. First, Gaut mentions purposiveness, contrasting with the product being purely accidental. At other times, he puts it in terms of agency: only agents can be creative (Gaut 2010: 1041; see also Kieran 2018; Stokes 2008, 2014, 2016). This condition is designed to rule out natural processes counting as creative, such as a tree producing new, beautiful blossom, and merely accidental outcomes, as when I fall against a piano and produce a series of notes.

It is sometimes assumed that AIs are not agents, and so they straightforwardly cannot be creative according to Gaut's definition (among others). But this depends very much on what kind of agency is necessary. A very minimal kind of agency is just a behaviour that is taken as a means to your goal. The tree does not have any goals or aims. When I fall on the piano keys, I am not thereby pursuing my goal. So minimal agency is sufficient to rule out these as creative processes.

Are AIMGs minimal agents? It is perfectly natural to describe them as having a goal: of producing music that fits the prompts that they are given. They have a non-accidental means of achieving this. If minimal agency is understood in this functional sense, we take it to be plausible that they are, or could reasonably be considered, minimal agents.

There are less minimal kinds of agency which might be relevant to creativity. We will mention three here: autonomous agency, authentic agency, and agency that incurs moral responsibility. In autonomous agency the agent does not merely pursue a goal, but in addition sets the goal for herself. Currently AIs do not do this—their goals are set by those who design the models and by those who issue the prompts. For the same reasons, AIMGs do not have goals that reflect their own sensibility—they lack authenticity. Nor do they seem to be morally responsible agents, in the sense by which they can be held responsible for, for instance, plagiarism or unfair use of other artists' works.

Of course, if we consider the AIMG together with human agents—the people who design and train the AIMG, the person who gives it the prompt—these people are typically capable of autonomous, authentic and morally responsible action. When they involve the AIMG in

their actions, it has a role in autonomous, authentic and responsible action, but not, typically, on its own accord.

However, whilst there were good reasons to accept that creativity requires minimal agency, we have not seen any reason so far to accept that creativity in general requires autonomous, authentic, or morally responsible agency. (We will return to some of these questions later.) However, for now we can conclude that AI appears to be able to meet Gaut's first extra condition on creativity, minimal agency, and that while it does not how any of the three additional kinds of agency, AI does not need to in order to be creative.

Understanding is more difficult to attribute to an AIMG. But again we need to ask: what understanding is required for creativity? A musician, a jazz musician for example, may be adept at producing new and appealing melodies and accompaniments. 'Understanding' here cannot mean a theoretical understanding of counterpoint and harmony. It must mean that the musician alighted on this particular melody because of its musical qualities—they have a grasp, perhaps intuitive and not entirely conscious, that these are the qualities that make for a good tune.

Does an AIMG have understanding in this limited sense? We might argue: yes. Having been exposed to a large number of pieces of music, the AIMG knows that certain note sequences can make an acceptable tune, and it generates a new melody on that basis. This looks like a kind of understanding. Indeed, the human musician has probably acquired her sense of what makes for a good tune in just the same way, by listening to a lot of music, and that experience is what enables her to create new musical ideas. In this respect, machine learning is modelled on the processes of the human brain, and therefore what the AIMG does is the same as the human (i.e. if the human is creative, so is the AIMG, since they have broadly the same neural structures). The ability to produce new ideas by exposure to many exemplars, underpinned by a neural system that is sensitive to patterns and similarities in the data, is common to humans and AIMGs and might lead us to attribute understanding to both.

However, Gaut might respond that the kind of understanding that can be attributed to AIMGs is not the same as, and indeed falls far short of, the understanding of human musicians. There are at least two different lines of argument he might take here. One is to emphasize the difference between the ways that AIMGs and humans come up with musical ideas. AIMGs are trained on vast datasets, often more music than human musicians would typically encounter. But what they learn to do is to 'predict' the next most 'likely' note, as described earlier. So insofar as an AIMG has musical understanding, that understanding concerns predictions based on huge datasets of music. This is, of course, not the same as the understanding of our jazz musician, who has had learnt with exposure to less music, and whose choice of the next note is not a prediction of likelihood. So even insofar as they each have some musical understanding, that understanding is very different, having both a

different content and a different basis. (We will return to a related question later—whether an AIMG exercises musical imagination.)

Further, Gaut might press a deeper objection, based on a traditional philosophical objection to the possibility of a computer having understanding. Even if an AIMG met the functional profile of musical understanding by producing music that is 'acceptable' based on its training, does that AIMG genuinely understand what it is doing? Does it even understand that it is making music, let alone beautiful, expressive, or exciting music?

It is beyond the scope of this paper to respond to this sort of objection properly. Here we will merely press again our question to Gaut: how much understanding, of what kind, is essential to creativity? We normally allow that children can be creative, even young children, but they may not have a very deep or sophisticated understanding of what they are doing. Would it not be possible to be a 'naive' musician who did not truly understand what they were doing, or a musician who played jazz spontaneously without any conscious grasp, for instance, of why they were playing what they were playing? If so, then at most creativity requires the musician to have a very minimal understanding of what they are doing, which it may be reasonable to attribute to an AIMG.

2.31 Gaut and flair—judgment and evaluation in AIMGs

Gaut's final two components of flair are (some degree of) judgment and evaluation. The former is intended to rule out painting by numbers. The latter is intended to rule out a case where a chimp with a paintbrush produces something aesthetically pleasing but is stopped from continuing to paint and making the painting aesthetically worse by the chimp's trainer removing the paintbrush. (That this kind of judgment is an artistic skill is evidenced by Apelles's comment on his admired rival, Protogenes, 'quod manum de tabula scirat'—He knew when to take the hand from the picture (Pliny AD77).)

It might be thought that an AIMG generates music by numbers: it is following a rule for producing notes. However, there is a crucial difference. In the case of painting by numbers, one might think that the creative input comes from the creator of the rule (the unpainted, numbered picture). But in the case of the AIMG that is the AIMG itself. Nonetheless, one might think that the application of the rule in some new piece, even if it is the AIMG's own rule, is still too mechanical. Exercising judgment, in a human, here seems to be something like this: 'I could do A or do B. B looks like it will produce a better result. So I'll do B.' This looks like a prospective version of Gaut's final criterion, evaluation, in which the creator evaluates what she has done and judges 'that's fine as it is, let's stop there'. Presumably they might have judged, 'that's not entirely satisfying; how could it have been better?' And the AIMG does not engage in that kind of judgment and evaluation, either prospectively or retrospectively.

AIMGs currently do not involve evaluative judgment of this kind. The music produced by an AIMG is primarily a matter of generating notes and their characteristics that are highly probable given the training data. That training data does not distinguish between works of different quality. It is the person prompting the AIMG who then chooses amongst its outputs who exercises evaluative judgment, not the AIMG itself.

This, however, is in a state of change and development, explicitly with a view to future AIMGs ultimately incorporating evaluative judgment. The subfield of Computational Aesthetics aims to develop computational methods for the evaluation of work for its aesthetic or artistic properties and the prediction of human aesthetic/artistic judgments. The field initially focussed on photography, and then extended this to other visual arts. Recently music and other audio products (speech, sound effects) have been included among the fields under study. In its earliest phase, models in Computational Aesthetics aimed at predicting simple human judgments of quality (good/bad, professional/amateur). Models have been effective in this regard when working within bounded fields. (AI still has difficulty in identifying the truly great works—transformative art in Boden's terms.) More recently, research has sought to broaden the types of evaluative judgment (e.g. colour harmony or composition in a visual image), using thicker aesthetic or artistic concepts. Researchers argue that direction of current research should be to incorporate interpretable and/or explainable AI. Thus a model might not just be able to predict an artistic score, but be able to explain its judgment (Chounchenani et al. 2025). Or the model may incorporate operationalizations of theories from cognitive psychology (Jin 2026).

The work in Computational Aesthetics just mentioned aims to predict human judgments of work produced by humans. It is a natural step then to apply this to AI produced work, so that one AI model produces the work and another evaluates it. The next step is to bundle these, so that the model produces several options and then evaluates them and then implements the best one. This would mirror what frequently happens in human creativity: the composer is writing the development section of a movement in sonata form, several ideas for varying and developing the first subject appear plausible, but she needs to choose one. Or she needs to modulate back to the tonic from a distant key—more than one way of doing this is possible; but which is best in this context?

Obviously there remain differences between the evaluative judgments of the AIMG that incorporates variation and judgment, and a human musician or composer. Notably, such an AIMG would have to be developed with on the basis of a particular set of qualities. Whilst a human musician would begin developing their evaluative judgment by following the lead of others, including perhaps the most popular or successful music, we might expect them in the end to develop their own evaluations. That is, they would develop their own personal taste, which would inform and shape their compositions. At this point, they are making authentic, autonomous evaluative judgments which might conflict with or go beyond current tastes.

This seems to be beyond what can be expected of an AIMG. Indeed, one concern about the kind of architecture discussed above is that it will tend to be conservative—it may end up producing highly polished work that is clearly situated within a well-established genre or style. Nevertheless, once again, we can ask whether this sort of individual, highly developed evaluative judgment is essential for creativity. In fact, we doubt that any evaluative judgment is essential to creativity. Whilst some artists create works of art by making artistic choices reflecting evaluative judgments of what they take to be good works of art, and they judge the final work successful, not all creation occurs in this way. Some artists, even some who are very highly regarded, are very critical of their own works, judging them not to be good. Nor does it seem impossible to create a work of art without evaluating it. Indeed, the jazz musician we mentioned earlier might improvise whilst explicitly trying not to judge their own playing—at least consciously and explicitly—since these judgments might interrupt their improvisational flow. Likewise, children might create music or other works of art without evaluation. They would still be creative. So there can be creativity without positive evaluative judgment, but more importantly, without evaluative judgment at all.

2.4 Extended versions of the standard view—Brainard on agency and curiosity

Lindsay Brainard (2025) also argues that creativity requires agency of a certain kind and that AI does not possess this kind of agency. She also argues that creativity requires a kind of curiosity and that AI does not possess this either.

Drawing on work by Gary Watson (1996), Brainard argues that creativity requires a degree of agency characterised as *attributability* whereby an act is attributable to an agent if it discloses '[. . .] what the agent stands for (Watson 1996: 233). And the action must subject the agent to appraisal on the basis of what is disclosed' (Brainard 2023: 14). Brainard records the result of a prompt to ChatGPT requesting a sonnet about cheese, a result that is indeed a funny and appropriate sonnet. She argues that the writing of this sonnet is not attributable to ChatGPT in Watson's sense. The relevant questions are, she says, 'Did the event of ChatGPT producing the cheese sonnet disclose the identity of ChatGPT? Did it reveal what ChatGPT stands for, what it has chosen to adopt as its ends? Does the cheese sonnet flow from ChatGPT's values and commitments?' 'It strikes me', she says, 'as highly implausible to answer any of these questions in the affirmative . . . Taken literally, it's an expression of deep appreciation of cheese. Should we conclude that ChatGPT deeply appreciates cheese? Certainly not.' (Brainard 2023: 17).

Regarding curiosity, Brainard compares two cabinetmakers who each makes a doll's house, one of whom follows a set of precise instructions, while the other sets out to see what she can achieve with the resources available to her. The former is not creative whereas the latter is. The latter exhibits curiosity in her approach, wanting to know what is possible. But an AI does not have this kind of curiosity.

In our view Brainard attributes to creativity features that are often (but not always) found in those instances of creativity that produce works of great value, but which are by no means essential to creativity.

Consider an accomplished court composer asked by his king to produce a madrigal to accompany the cheese course of a great feast. The composer doesn't like cheese, but is able to imagine what it is like to be a cheese-lover. The composer doesn't even like the madrigal form, regarding it as old-fashioned. Nonetheless, with little effort he is able to produce a fine madrigal that pleases the king and his guests. If we ask Brainard's questions of the court composer, again the answers would be negative—this madrigal does not reveal what the composer is and stands for, neither as a gourmet nor as a composer. But that does not stop the composer from being creative in producing the madrigal. He was imaginative and produced a very good madrigal. To produce this result he intuitively reached for some novel and effective metaphors, suitable melodies, and effective polyphony, but did not spend time exploring different possibilities.[4] So this work does not exhibit curiosity either. So, even if not an example of the highest level of creativity, it is still an example of creativity, perhaps a greater level of creativity than most of us ever achieve.

So Brainard's criteria for creativity are too demanding—much human creativity does not satisfy them, and so we should not require AIs to meet them either. She might reply that our court composer has nonetheless done more than ChatGPT in writing the cheese sonnet. The composer has exercised his imagination in order to understand what a cheese-lover might feel or to understand what makes for an effective madrigal. That would be right. But then either we are back with Gaut's idea that we rejected earlier, that understanding is required, or we anticipate a view that we will discuss shortly that takes imagination to be central to creativity.

2.4 Conclusion: the standard (value-centred) view of creativity and AI music generation

Can AIs that generate music be creative? The answer is sensitive to differences in the analysis of creativity. The answer, on the simple version of the standard view, is a clear *yes*. For AIMGs produce work that is both new and valuable. The degree of novelty and value may not be very high as yet, but even if one sets the threshold levels for these characteristics higher, it is clear that advances in AI will allow AIMGs to meet exceed these thresholds—put the thresholds any higher, and we would exclude many human creative professionals from the category 'creative'. This conclusion seems especially plausible in the light of concerns that AIMGs are about to replace creative human individuals in certain spheres of musical composition.[5]

[4] We imagine that this composer wrote his own verse, as did several madrigal composers, including Carlo Gesualdo and Thomas Morley.

[5] See e.g. the report by CISAC (International Confederation of Societies of Authors and Composers) https://www.cisac.org/services/reports-and-research/cisacpmp-strategy-ai-study accessed 2026/04/22.

Boden's extended version of the standard view add the requirement of surprisingness. We have shown that AIMGs are capable of surprising us in the two more straightforward ways, corresponding to combinatorial and exploratory creativity. We have suggested that though no current AIMG has exhibited transformational creativity, the possibility, if remote, cannot be ruled out.

Gaut's additional requirement of flair is complex. That it involves purposive agency, understanding, judgment, and evaluation makes it appear as if it could only be possessed by a human. But we can see that creativity plausibly requires only a minimal version of each of these qualities. These minimal versions are or could be implemented in an AIMG. Gaut might respond that there is a special kind of creativity that involves these qualities to a high degree: we might call it self-aware, autonomous creativity. Brainard requires that creativity should manifest attributable agency and also curiosity. We have argued that creativity in general does not in general require these characteristics. Nonetheless Brainard too might maintain that these are required by a higher kind of creativity. At least as they are currently configured AIMGs do not exhibit self-aware, autonomous creativity, nor creativity with attributable, authentic and curious agency.

We will return to the 'higher' kind of creativity later, when we ask why it matters whether AI is creative.

3. The non-standard view of creativity with regard to AI music generation

The non-standard view agrees with the standard view that originality is essential to creativity, and as we have seen that condition is satisfied, albeit not to a very great degree, by AIMGs. The principal difference is that Hills and Bird (2019) do not require that the products of creativity are valuable or tend to be valuable. It follows that AIMGs do not have to produce music that is good in any respect to count as creative.

However, Hills and Bird do say that creativity necessarily involves exercise of the imagination, plus some degree of fertility and motivation to bring works to completion. The crucial question for us, then, is whether AIMGs use something that is equivalent to the imagination when they produce music.

3.1 What is the imagination?

We consider the principal characteristics of the imagination to be the following:

(i) the imagination is able to represent possibilities beyond those we believe to be true (Aquinas 1964: I 85 *ad* 3; Stevenson 2003);
(ii) imagining is belief-like (Currie and Ravenscroft 2002; Carruthers 2006; Williamson 2007) or perception-like (Aristotle 1961; Hume; Thomas 1999; Kind 2001; Currie and Ravenscroft 2002; Stevenson 2003);
(iii) the imagination is subject to the will (Ichikawa 2009; Arcangeli 2019);

(iv) the imagination is used in hypothetical reasoning (Carruthers 2006; Williamson 2007).

The most obvious characteristic of the imagination is that it allows us to consider possibilities including:

- non-actual possibilities,
- possibilities that might be actual but we do not know or believe to be so,
- possibilities that are actual and known to be, but which are 'not present to the senses' (Kant 1781: B151).

Such possibilities include the fictional possibilities found in novels. The author has exercised her imagination in thinking up these possibilities and the reader typically exercises their imagination when they read the novel. The artistic, creative imagination is not exclusively concerned with fiction in this sense. A composer may imagine a tune or progression in her head as part of the compositional process and then commit it to paper if she is happy with that idea. A scientist may imagine a theory with certain axioms or assumptions. In the latter case the theory might be true, so the possibility is an actual possibility, though the scientist does not yet know this. A general might imagine the disposition of enemy troops and artillery beyond the mountain ridge. Because they know the area and have excellent intelligence, this imagining is entirely accurate, and the general may even know that it is.

Both belief and perception can represent a non-actual possibility—false beliefs, misperceptions, hallucinations, and the like show this. But imagination differs from belief and from perception in that the latter constitutively aim at the truth (or knowledge) (Williams 1973, Williamson 2000). Something has gone wrong with a belief that is false or with an illusory perceptual experience. But there is no failure with imagination *per se* when what is imagined is not true/actual. As with the scientist and the general, one can intend that what one imagines should be true, and that intention can fail. But that is not a case of 'mis-imagining'. A failure of imagination is not imagining something false, it is a failure to imagine anything at all.

Nonetheless, imagination is belief- and perception-like in certain ways. When the composer imagines the tune, her experience is of an auditory nature. It is *like* hearing the tune. This is imagistic imagination, so-called because visual imagining involves having a visual image that shares something with actual seeing—the term 'imagistic' is extended to the other senses. Indeed imagistic imagination involves use of the same neural structures as does actual seeing and hearing. So this kind of imagination can be seen as a kind of off-line 'perception': 'episodes of mental imagery are occasions on which the visual system is driven off-line, disconnected from its normal sensory inputs' (Currie 1995: 26). Although the images and auditory experiences involved in imagination are usually clearly distinguishable from perception, that is not always the case. We sometimes remark 'Did I really hear that or was that my imagination?'

While some imagination is imagistic, not all is. The reader of the Harry Potter stories imagines a world in which magic spells are causally efficacious. But it is difficult for that

imaginative possibility to be conveyed by images alone. Such imagining, propositional imagination, stands to belief as imagistic imagination stands to perception. Propositional imagining is also usually clearly distinct from believing. But again sometimes this is not the case. A scientist may imagine that her theory is true but not believe it to be true. But as the evidence mounts she comes to believe that the theory is true. At some intermediate point it may not be clear whether she just imagines or now believes the theory to be true. Note that not all imagining used in musical composition is imagistic. A composer may imagine how a piece would be with the introduction of a new theme in the development section. Would this addition of an unexpected element increase the excitement and tension of the piece? Or would it overcomplicate the structure which might come across as confused and aimless? On its own auditory imagining of the new theme cannot answer these questions, which needs also the use of propositional imagining.[6]

A key difference with belief and perception is that imagination is typically voluntary: it is subject to the will whereas belief and perception are not. Although I can choose to see or in what direction to look, normally, once I open my eyes or direct my gaze, what I see is determined by the world, not by my will. Although we engage in acts of self-deception and other kinds of unconsciously motivated belief, normally I cannot choose to believe that *p* if I am aware of overwhelming evidence against it. Just as, if I open my eyes and look at the sky on a cloudless sunny day, I cannot help but have a perceptual experience of a blue sky, I cannot help but believe that it is sunny rather than cloudy. Whereas it is simple and unproblematic on such a sunny day to imagine a cloudy day, both imagistically and propositionally.

The final characteristic of imagination is its distinctive role in reasoning, hypothetical reasoning in particular. As Myers (2021) points out, '. . . while perception allows us to take in new evidence about the world, imagination allows us to reason out what follows from evidence that we already have.' He gives this example:

> Jenga: Jessica is playing a game of Jenga, the classic party game in which players take turns trying to remove blocks from a tower without causing it to topple over. Jessica is unsure whether removing a particular block will cause the tower to fall. In order to find out, she imagines reaching out her hand towards the tower and gently removing the block in question. As she imagines herself pulling the block away from the tower, she imagines that the tower does not fall over. On the basis of this imagining, she forms the belief if she removes the block, the tower will not fall.

[6] Arguably a composer could auditorily imagine the whole piece with the new theme suitably worked in. But in practice that is not how composers think about structural possibilities for their works. And in any case, that would only be imagining one way of incorporating the new idea.

3.2 Artificial intelligence and the imagination

We can now consider whether AIMGs do or could easily satisfy the characteristics of imagination. The first of these is the capacity to represent non-actual and other possibilities beyond those we believe to be true. Clearly AIMGs do this. Their outputs are or are representations of novel pieces of music.

Less clear, however, is whether AIMGs satisfy the second characteristic, that these representations are belief-like or perception-like. Consider perception-like imagination. In the first place, AIMGs lack conscious experience, so there is 'nothing it is like' for them to hear music inwardly.

Even on a fully functionalist approach to the mind, one that questions the existence of qualia, there are strong grounds for denying that AIMGs have perception-like imagination. They do not have anything that has the function of auditory perception, that is, they do not have the capacity to listen to music. Their contact with music is through data, not through sensitivity to sound. Accepting Currie's view that imagistic imagining is offline use of the perceptual function entails that auditory imagining is not possible for AIMGs. In addition, even if we put the offline perception account of imagistic imagining aside, it remains the case that we cannot find in the AIMG any structure or process that corresponds to imagining the musical idea. The AIMG directly produces the output using the predictive mechanism described in Section 1.1. There is nothing here that corresponds to the kind of contemplation of a musical idea in a manner akin to 'listening to it inwardly' that we find in the human imagining of that idea.

It might be thought that even if an AIMG does not listen inwardly to musical ideas, it nonetheless does engage in a parallel process of engaging with the digital representations of musical ideas. It is plausible that when a human hears a tune in her head which causes an aesthetic judgment, there is some neural process occurring (the realiser of the hearing of the tune) that causes another neural process (the realiser of the aesthetic judgment). Let us say that the AIMG engages in the digital equivalents of these neural processes. If so, one might argue that even if the AIMG is not imagining as we do, it is nonetheless doing something that is the digital equivalent of what our brains do when we imagine. Furthermore, someone who holds qualia to be epiphenomenal (or non-existent) might suggest that this is in fact really all that is important in what we do.

It is important to note that this description of what that AI model does is not necessarily correct and indeed is often incorrect. The apparently close functional similarity between the human neural process and the AI process masks important differences. Let's say that a work has some aesthetically pleasing feature (a perfect cadence in a major key) that is realised by a physical property (a description of the relationships of the frequencies involved), and let's say that D is the digital representation of that physical property. The AI may work by detecting and making predictions based on D. But it need not and often does

not. Instead it may operate by detecting some other property D* that is correlated with D in the training set, and which is in effect being used as an unintentional proxy for D. And D* might be very different from D, representing something in the 'real world' quite unlike either the physical or the aesthetic properties in question. That difference may not be obvious, but much show up in unusual cases. In a famous example, researchers doctored an image of a panda bear with noise in a manner imperceptible to the human eye (Goodfellow et al. 2014). Whereas the AI model correctly classified the undoctored picture as a picture of a panda, it classified the doctored picture as a picture of a gibbon with 99% confidence—even though the two pictures look identical to a human. Which suggests that the AI's 'neural' process is not equivalent to the human's in this case.

Consider a congenitally deaf person who studies thousands of videos of the fingering of great jazz pianists and is able to work out which finger combinations and movements are often used. She copies these combinations and keeps a careful eye on her audience to see whether her audience is responding positively and adjusts what she does accordingly. She becomes known as an accomplished jazz improvisor, while never hearing a note, neither one that she plays nor one she hears inwardly in her head. While it might turn out that she is being creative in certain ways, she is not exercising a *musical* imagination nor is she a *musical* creative. The AIMG is in a similar position. Whatever else we might want to say about it, it is not exercising *musical* imagination. And so we should conclude that it is not *musically* creative. (Which is *not* to say that a person who is deaf cannot have musical imagination, as Evelyn Glennie shows.)

As noted above, not all musical imagining is imagistic: some is propositional. Propositional imagining, according to the view of imagining as offline activation of cognitive processes, is offline believing. So our question now is: do AIMGs have a system functionally equivalent to believing or related cognitive states. That is, do AIMGs have any system whose function is to store propositions under the condition that they are true and which interacts with desire-like states to produce action?

It could be argued that the system's training set constitutes a database—it 'believes' that these are extant works of music that have the properties attached to them in their metadata, and 'wants' to write its own music based on those properties. But typically an AIMG is the product of its training and is detached from the training data thereafter. The training data plays no further role and is not able to interact with other states of the AIMG, and so there is no parallel with the way belief (or states related to belief, such as memory) can cause a person to act or change their mental states. No doubt, in an AI robot, the training data *could* be part of the AI's memory and the AI would have beliefs. But the beliefs we need are ones concerning the components of the piece of music that the AIMG is generating—beliefs about structure. As currently designed AIMGs do not do that.

The third characteristic of imagination is that it is subject to the will. If I hear the orchestra, then the stimulus is the external sound of the orchestra operating on my properly

functioning auditory system. Whereas if I imagine the orchestra then the stimulus is my decision to imagine it (or some other such internal stimulus). Once the AIMG has received its prompt, all its subsequent states are brought about by internal stimuli. One might then claim that any subsequent state that is a putative imaginative state will meet this condition of being (functionally equivalent to being) subject to the will. However, the prompt certainly could be regarded as an external stimulus. Nor is it clear that AIMGs in any sense make a choice to generate music in response to the prompt. So it is highly questionable whether they meet this condition.

However, whilst imagination is very often subject to the will, there are instances of imagination that are not chosen. If I say to you, 'imagine a pink elephant', you may find that you do so immediately, without any sense that you decided to do so. Indeed, if I say 'don't imagine a pink Elephant', you may likewise find that you do so, unwillingly, as it were. So since there can be imagination that is not subject to the will, even if AIMGs do not plausibly choose to generate music, this rules out their having only one kind of imagination, rather than ruling out any kind of imagination at all.

The final condition is that the imagination can be used in hypothetical reasoning. At present there is nothing like this in AIMGs. Nonetheless, we have already seen a context in which AIs could employ hypothetical reasoning on its contents. In discussing whether Gaut's concept of flair could be applied to AIMGs we saw that although they currently do not engage in judgment and evaluation, with additional architecture they could do so. The AIMG could generate multiple versions of the same work, evaluate them according to a quality metric, and select the best. This is to engage in a kind of hypothetical reasoning: if the piece were to be X, then its quality would be Y.

3.3 Fertility and motivation

Hills and Bird (2019) mention two further conditions for creativity. A creative subject should have some degree of fertility—a subject who produced one piece and was not able to do so ever again would not be a creative individual. Of course, people can lose their creativity or have it thwarted by material conditions—but if they remain creative they are *disposed* to produce more works should circumstances permit. A creative subject is also motivated to bring their ideas to fruition. A subject who could dream up wonderful tunes in her head but did nothing to write them down or to sing or to record them (etc.) would imaginative but not creative. Creativity relates to creating and making—the condition of motivation captures this idea.

AIMGs already satisfy these two conditions. They are certainly capable of producing many distinct works and thus show fertility. It might be odd to attribute motivation to an AI. But in the sense used here, that is just shorthand for a disposition to bring the work to completion, and AIMGs certainly do that.

3.3 Conclusion: the non-standard (imagination-centred) view of creativity and AI music generation

The non-standard analysis of creativity asserts that value is not an essential requirement of creativity. But it does require that creative works are produced by exercise of the imagination. This presents a significant challenge to the proposal that AIMGs are creative. If one takes the view that imagining is a matter of the offline use of perceptual and other cognitive powers, such as believing, then the problem is that AIMGs do not have such powers. Even if one is neutral on that proposal, it remains the case that AIMGs do not do anything that looks, functionally, like the consideration of a musical idea qua *musical* idea5. Therefore we conclude that AIMGs are not creative.

4 Creative AI music generation and the value of creativity

We have seen that whether AIMGs are classed as creative or not depends on the definition of creativity, and on what mental states it is plausible to attribute to AIMGs. But we might ask why this matters. What turns on whether AIMGs are creative or not? What is the value of creativity?

The standard view has a simple and powerful answer to the question: why does it matter if AIMGs are creative? According to this view, creativity produces ideas that are new and valuable. As we have seen, things are not quite so straightforward since the value that is produced need not be very great. Nevertheless, there is a fairly straightforward answer as to why it matters whether AIMGs are creative: if they are, they are producing new music that is good (in some respect).

Boden's version of the standard account also required that the products of creativity be surprising (to various degrees). Perhaps we simply do value surprisingness in a work of art, though it is not of course true that the more surprising a work is, the better it is. As noted earlier, Schoenberg's music is more surprising than Mozart's, in the sense that the latter worked within the constraints of the classical style, and the latter developed a new style of atonal music. But it would be controversial to claim that Schoenberg's music was more valuable than Mozart's. However, we might agree with Boden that there is something particularly important about transformational creativity, when it occurs, because it open up new spaces of possibility for other creative artist to exploit. In this respect, Schoenberg's creativity may be more impressive than Mozart's.

Gaut's account, we suggest, is best regarded as not an account of creativity per se (since it ruled out too much as uncreative), but rather as an account of self-aware, autonomous creativity. Perhaps this kind of creativity is more likely to produce works of great value than a more minimal, less self-reflective creativity. But we might also see it as a kind of virtue, whereby the creative artist is fully attuned to what she is trying to achieve, and why. We might reasonably value and admire this kind of aesthetic virtue, as an appropriate response

to aesthetic value, whether or not the outputs are in fact better works of art. Brainard likewise describes a kind of creativity that, because it requires authenticity and curiosity, may be a particularly valuable kind of creativity. But it is not an account of creativity in general.

In Gaut's and Brainard's views and also in Boden's description of transformational creativity we are offered accounts of kinds of creativity that AIs do not achieve and will find it difficult to achieve, because AIs do not have understanding, authenticity, curiosity, or the ability to transcend their training set. Yet these accounts of creativity go beyond what we expect of creativity in general—more commonplace instances of creativity do not need to possess these features.

Finally, we turn to the non-standard, imagination-based view. Though we have elsewhere defended this account of creativity, it is not immediately obvious why creativity matters on this view. That is, if AIMGs produce a piece of music, why does it matter whether they do so via the imagination, or by some other, non-imaginative method? Moreover, according to this view, there is no requirement that the work itself has any aesthetic value, or indeed value of any other kind. So what is the value of creativity if it is imagination-based?

We do not have space to give a full answer here, but we suspect that the answer lies in the connection between the imagination and other mental states that might shape and fuel creativity, and the social role of creative art.

Imagination has a key developmental role in human social life through its role in children's play. Through play, especially games of imagination, we develop social understanding and other social skills. Storytelling and making music together clearly contribute here. Art can also help us express and communicate emotions, and so help us understand each other better.

Even in artistic creativity that is far removed from childhood play, we can see a similar social role, as artists respond to one another and to their social world. Take, for instance, the development of atonal music. As we have already seen, even this apparent musical revolution drew on earlier work by Wagner, and others. But it also responded to developments outside of music. The early twentieth century was a time of dramatic changes across many different artistic fields, including literature, with the beginnings of literary modernism, and in art with Post-Impressionism developing into Fauvism, Cubism, and Expressionism. It was responsive to social and political ideas too, developing during and after the First World War. It is this combination of imagination and responsiveness to broader cultural and social events that enables Boden's transformational creativity. As with Gaut's and Brainard's 'higher' kinds of creativity, this is a much greater challenge for AI, both because AI lacks imagination and because it is unable to make those connections between quite different areas of cultural and social experience.

In short, our answer is that imaginative creativity is valuable because of its role in human social life. Even if an AIMG had imaginative capacities—and we have argued that it does not—it would need to be embedded much more fully in a human social world to have the same kind of creativity, of the same kind of value, as a human musician.

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