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Peer Review

Review of: "The Hard Problems of AI"

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Theoretical Overlap and Pragmatic Discrepancies Among Philosophy, Psychology, and Engineering: **A Review of the "Hard Problem" of AI"**

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Tiuninas (2025) offers an interesting perspective on AI. His article about "Hard Problems" brings what might be labeled a philosophical perspective to the current debates about AI. This is useful because it clarifies key assumptions being made on all sides of the debates. The "hard problem" in the title to his article concerns consciousness broadly defined, but there are implications for the creativity of AI. I should say "ostensible creativity of AI," given that I have rejected its authenticity more than once (Runco, 2023, 2024, 2025). I have rejected claims that AI can be creative largely because the processes used by humans when they are authentically creative are beyond what we can expect from AI, and when creativity is attributed to AI, the focus is on the output and ignores the underlying processes. More will be said about that below.

First I want to acknowledge that several of the points identified by Tiuninas complement the psychological perspective on AI and creativity. This is reassuring, given that the psychological perspective is firmly rooted in the (social and behavioral) sciences, while, as noted above, Tiuninas draws heavily from philosophy. He is well aware of its variance from psychology. He wrote:

"The question of whether an AI system is conscious, creative, intelligent, agentive, etc., when asked in the strict sense, is meaningless. What I mean by a strict sense is that the person asking the question is driven by an underlying assumption that an unambiguously correct answer to the question can be deduced by examining the limits of what falls under the predicates....Since the predicates are vague, and the reason we even ask the question

in the first place is because the behavior of AI systems lies on the outskirts of the applicability of a given predicate, no definitive answer can be given. On the other hand, if one asks the question in a pragmatic sense, i.e., in the sense of 'what is it most helpful to think of AI systems as?', some answers may turn out to be more useful than others. However, this is subject to psychological and sociological factors, not conceptual ones that philosophers are typically preoccupied with."

There are several psychological reasons to conclude that the question of creativity is meaningful. It may be that there is more agreement between psychology and philosophy, at least when it comes to AI, on a conceptual level, and that the disagreements are most pragmatic. This possibility will surface several times as closely examine the current debate over the definition of creativity.

Redefining Creativity for AI to Distinguish Artificial vs Authentic Creativity

Several of my efforts, and those of a few others (e.g., Holyoak, 2024), have attempted to redefine creativity to allow a meaningful answer about the ostensible creativity of AI (or, more precisely, generative AI). Indeed, suggestions that AI can be creative have rejuvenated efforts to define creativity in a meaningful way. For decades the standard definition of creativity held sway. That definition goes back well over 100 years (Runco & Jaeger, 2012). The standard definition requires originality (or novelty) and effectiveness (or utility) for creativity. Beyond that, it has been interpreted in several different ways. One view is that the standard definition specifies criteria that can be used to evaluate products and output. In this light, any creative idea, solution, or output needs to be original and effective. The other view is that the standard definition points to what is required of processes involved in creativity. In this light, key processes (which are cognitive, extracognitive, and metacognitive) are those which allow or lead to original and effective ideas and insights.

These two interpretations of the standard definition led to different conclusions when AI matured and started to generate products of various sorts (poems, code, music, and ideas). The product view attributed such output with originality and effectiveness (Chen, Sun, & Han, 2023; Doshi, Rajnikant, & Hauser, 2023; Haase & Hanel, 2024; Hitsuwari, Ueda, Yun, & Nomura, 2023; Koivisto & Grassini, 2023; Lyu, Wang, Lin, & Wu, 2022; Meincke, Girotra, Nave, Terwiesch, & Ulrich, 2024; Nguyen, 2024). The process view saw the apparent originality and effectiveness of AI output as indicative of a need to learn more precisely what creativity is (and how it must be defined) and what it is not. From that point of view, if AI can produce original and effective things, and thereby satisfy the two requirements of the standard definition, then that definition must be too liberal and a redefinition needed. According to this perspective the output of AI should be recognized as artificial creativity, which can easily be contrasted with the authentic creativity of humans (Runco, 2023/2025). (That label also nicely parallels the concept of artificial

intelligence.) It may even be that it is most accurate to categorize the output of AI as *pseudo-creativity*. This is the label that Cropley (1999), May (1959), and Nicholls (1972) gave to things which appear to be creative but in fact result from processes that are directed to noncreative ends (e.g., fame, shock). Pseudo-creativity is an unintended result, yet the individual involved may be mistakenly attributed with creativity anyway. Pseudo-creativity might be contrasted with authentic creativity in that the former may display originality but lacks effectiveness or utility. That is why the standard definition is bipartite: originality by itself is not creative. In a sense pseudo-creativity parallels the idea of a mirage in the output of AI (Schaeffer, Miranda, & Koyejo, 2023).

The notion that creativity is often attributed to products would seem to complement Tiuninas' discussion of the "private area model." Indeed, he was explicit about attributions by observers. Tiuninas described how "attributions are independent of a stipulated internal process" and further described how we often "attribute mental events to others." These descriptions may be useful in the psychological studies of creativity, and in particular useful when considering attributional theories of creativity. The most extensive of these is probably that of Kasof (1995), but the position that creativity depends on attributions can also be found in many social approaches to creativity. Csikszentmihalyi's (1990) systems theory, for example, proposed that ideas from individuals are only creative after a field and eventually and entire domain recognizes them as creative. Common questions about attributional theory within psychology reflect concerns for inter-judge agreement and a reliable consensus about what is creative and what is not. That is not all of it, however, because the attributional approach does not apply to several important kinds of creativity, including everyday creativity, creative potential, and personal creativity (where there is no product or social recognition). Of direct relevance is Tiuninas' valuable description of "two quite separate concepts: the properties of our mental representation of X and the properties of X." This can be extended to include the attributions of creativity which are entirely separate from the creative event itself.

The attributional approach and the distinction of product from process are each parts of the oft-cited 4P and 6P frameworks commonly used in the study of creativity. The former distinguishes between creative personality, creative process, creative product, and creative place (e.g., settings). The latter is a hierarchical reorganization which uses all of those 4Ps but places each under either a Creative Potential category or a Creative Performance category. Personality, process, and place all are subsumed under the first of these because none of them guarantees actual creative performance. They each merely contributes to the potential for creative performance. They do increase the probability that creative behavior will be displayed, but the probability is at best moderate, at least when only one of the

contributions (e.g., personality) is considered in isolation from the others. The performance category includes actual manifest creative behavior, which has been described as creative achievement, creative accomplishment, creative persuasion (Simonton, 1988), and creative products. In each of these instances of performance, probability is irrelevant because the focus is on what has already occurred or been expressed rather than predicting what is to come.

Several specific processes have been cited in recent discussions because they play a role in human creativity but are beyond what could be expected of AI. It does not have the inner experience (Holyoak, 2024) used by humans use when they create. AI lacks authenticity and intentionality as well (Runco, 2023/2025). The former refers to honest self-expression, and just as there is no inner experience, so too is there no self in AI which could be expressed. Intentionality refer to the mindful decision making and choice that characterizes the creative process used by humans (e.g., as they invest energy to explore options and persist in their ideation instead of taking the first solution that comes to mind). It may be seen as a kind of agency. Then there is the fact that human creativity often results from problem finding, something that occurs before possible solutions are attempted (Mumford et al., 1994; Runco, 1994). Research on autonomous scientists suggest that AI can generate new hypotheses, which has been interpreted as problem finding, but AI produces hypotheses only when prompted to do so. Humans, on the other hand, are often intrinsically interested in something and redefine tasks such that creative ideas can be found. The intrinsic motivation is such that extrinsic contributions are unimportant. For this reason creativity is often associated with spontaneity. In contrast to what occurs with AI, ideas and alternatives are not prompted and not elicited. Problem finding is sometimes called problem discovery or problem construction.

AI can only qualify as creative if such processes are ignored. This is especially problematic because, in psychology, process must be recognized for understanding and enhancement. The underlying processes are indicative of mechanisms and thus have explanatory power. Simplifying a bit, if you explain a phenomenon by identifying the responsible mechanism, you can make accurate predictions and even, to paraphrase B. F. Skinner (1975), exert control. That just means that decisions can be made to increase or decrease the probability that some behavior will occur in the future. If you understand the mechanism for creativity you can, for example, design educational programs that will in fact support it. You can even structure an organization to support it (Witt & Beorkrem, 1989). Studies of products relegate underlying processes and as such do not provide reliable information about how the product came about. It might be possible to infer what was involved when the products were created, but that would be inferential and post hoc.

Control is a potent concept but is sometimes misunderstood. In this context it refers to scientific precision. In laboratory research, for example, control means that confounding variables are identified and eliminated, or at least minimized with various experimental manipulations. Skinner's goal of "prediction and control" was intended to allow support for adaptive behaviors and the extinction of unwanted behaviors, which is one sense what all of education should be doing. He argued that this kind of control is not contrary to free will but in fact, if made explicit, gives individuals free will. I mention this because of the thrust of this review, that there is some overlap of psychology and philosophy.

There is another idea in this same (behavioral, or operant) school of psychology that may also be relevant. It suggests that the "how" is more important than the "what," which is another way of saying that process is more important than outcomes, products, or (when it comes to AI) output. This idea can be found in Skinner's methodology. The general label is "reinforcement." This is often confused with a reward but differs in that a reinforcer is defined in terms of how it is used. All reinforcers increase the probability of a particular behavior (an "operant") occurring in the future. Some involve administering a pleasant consequence, but others involve removing an unpleasant one. The latter is usually called something like "reinforcement through the contingent withdrawal of an aversive stimulus." The point is that the "how" is most important. "How" may involve providing something, or the opposite, taking something away. The position that "how" is more important than the "what" is consistent with the message of this article, and previous treatises on process over product. AI might produce original and effective output; that is the "what." More important is that it does so with processes (the "how") that are quite different from those used by humans when they are authentically creative.

This interest in "how" is indicative of the interest in psychology for a balance of theory with practicality. The latter is frequently apparent in suggestions for education, and there are several educational concerns about AI. One particular concern is that uncertainty about artificial creativity may lead to educational practices that are not well aligned with authentic creativity. Creative potentials will go unfulfilled if the processes that are involved in authentic creativity (e.g., authenticity, intentionality, problem finding, intrinsic motivation) are overlooked because they are not a part of the (pseudo) creativity that is implied by the working of AI. Hopefully this concern is unjustified, given that educators typically recognize that potential, though ambiguous and latent, is important. Educators might see their efforts as supporting latent potential so that it matures into expressed skill. More concretely, one student might submit an assignment that reflects a surprisingly advanced level of skill. If the teacher only considers what was submitted (the product), the student will receive the highest possible grade. That assignment could have been plagiarized, however, or done by someone other than the student–or

perhaps it was composed by a chatbot. None of these processes deserves the highest grade. Another student might turn in an assignment that is much less polished, but it could indicate that the student relied on his or her own divergent thinking, problem-finding and -solving, and autonomy. If so, this student put much more creativity into the work, even if the end result is less polished. Recall here that the intentionality mentioned just above refer to honest self-expression and mindful decision making, two things that are involved in an authentic creative process. This example with the two students is a bit simplistic but it does put the product vs process distinction into behavioral terms. It also describes the psychological goal of supporting creative potential so that it matures into expressed creativity. One last educational aspect of the present discussion is given just below–along with something on submarines.

Conclusion

This review opened with a comment about the value of drawing from both science (e.g., psychology) and philosophy when discussing AI. Most of the present effort draws from psychology. Some points of the present discussion may have drifted, but all of it was reaction to the philosophical points raised by Tiuninas (2025). Interestingly, his article also referred to engineering. Indeed, Tuininas quoted to Edsger Dijkstra, whom I previously cited Dijkstra in one of my own analyses of AI (Runco, 2024). Like Tuininas, I was intrigued by the question of whether or not submarines can swim. Dijsktra concluded that this was a meaningless question, but here again, there is a difference of opinion, no doubt resulting from the different perspectives. The submarine question also ties in with psychological pragmatics. I can explain:

I previously rejected the meaninglessness of the submarine question because it ignores the product-process distinction. An alternative way to look at it is in terms of emphasized values. The question might be meaningless if the only important or valuable thing is the outcome. That is quite different from the psychological point of view, such as my own, and the interest in understanding how something gets done (i.e., the process or mechanism). A submarine moves through the water, just as a swimmer does, but it makes no decisions and is not mindfully making choices, as a human swimmer does. In addition, I could not use a description of how a submarine moves through the water to teach a person how to swim. Thus, as a psychologist, I reject the idea that submarines swim, even though they move through the water. Certainly they do move through the water, which is the end result or outcome, just as a swimmer does, so if moving from point A to point B is the only important thing, than the definition of swimming as involving choices and mindful decisions is irrelevant.

There are various perspectives on all things AI. The paragraph above touched on an engineering perspective, Tiuninas went into detail about philosophy, and my review above was mostly devoted to psychology. Perhaps a neuroscientific perspective of the "Hard Problem" will also be published. That

would be useful because, while I have pointed to the differences in the processes used by AI and humans, there are other considerations. Recall here that Tuininas cited a computational functionalism that uses "neural networks that are analogous to the ones producing human consciousness." Neural networks are analogous but seriously dissimilar to the organic neurochemical structures and systems of the human brain.

For now, the key point, aside from the recognition of different perspectives, is that the output or products from AI (like those from humans) do not say much if anything about the underlying processes. AI does process information, of course, but there are good reasons to believe that they are not the same processes used when humans are creative. The updated standard definition of creativity specifies several options, such as originality and effectiveness but also authenticity and intentionality (Runco, 2023a, 2025). Authenticity suggests a process whereby the human self is expressed. Ideas and thoughts may be shared, and to be authentic, they must be truthful. The self is not inhibited; the individual does not conform (to what others expect, nor to existing conventions). Intentionality suggests that choices and decisions are mindfully made. They are processes which confirm that human creativity is not algorithmic. It is mindful. Humans have selves, they have minds, and they have inner experiences, and all of it results from organic structures and processes. AI can mimic creativity, and some of the processes may be analogous to what occurs in the human mind, but for those of us who see value in the questions surrounding a scientific explanation of what is involved, creativity is not possible by AI. Tiuninas' philosophical perspective pinpoints the critical assumptions being made about AI and reminds readers that there are intriguing and divergent perspectives on the topic.

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Declarations

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