Symbolic placeholders for non-spatial concepts: hope for solving the mind-body problem

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I. Introduction

In his paper "Can We Solve the Mind-Body Problem?" Colin McGinn answers the question posed in the title with a firm "no"—human beings cannot produce a theory which explains how physical activity in the brain can give rise to consciousness. Adopting standard physicalist assumptions, McGinn holds that the brain does, by some natural and scientifically-describable process, give rise to consciousness. But consciousness is a non-spatial phenomenon; it is not an object of perception laid out in space. Thus, it will never be satisfactory to provide an answer to the mind-body problem by pointing to spatial properties of the brain. According to McGinn, the solution to the problem must involve apprehending the non-spatial property of the brain that can explain the similarly non-spatial phenomenon of consciousness. McGinn makes use of the highly plausible claim that human beings' cognitive abilities restrict them to understanding the brain only in spatial terms, and thus preclude the grasp of non-spatial properties like that which causes consciousness. In McGinn's words, humans are thus *cognitively closed* to the property of the brain from which consciousness is derived. (Let us call this property P, as in McGinn's paper.) McGinn argues that because humans are cognitively closed to P, we are prevented from constructing T, a theory which explains how the brain gives rise to consciousness. I affirm his point on cognitive closure but will here argue that cognitive closure to P does not necessarily prevent construction of a scientifically respectable theory relating brain to mind.

II. Reproduction of McGinn's argument

McGinn's argument assumes a standard version of physicalism, the view that physical brain events cause consciousness, and their relationship can be explained using science. This implies that consciousness must be caused by or explainable in terms of physical properties: "There exists some [physical] property P, instantiated by the brain, in virtue of which the brain is the basis of consciousness" (353). The theory of consciousness we seek, per McGinn, will explain how the physical and nonspatial property P gives rise to consciousness, or conscious experience. Following McGinn, I will refer to this theory as 'T'. Next, McGinn argues that the human cognitive apparatus prevents it from ever achieving a 'grasp' of P. To show this, he canvasses what he takes to be all the possible routes to achieving this grasp—introspection, physical observation, and inference from physical observation—and argues that none of them will allow us to grasp P. Finally, he asserts that a grasp of P is necessary for obtaining knowledge of T, the theory that explains how consciousness arises from brain matter. McGinn's argument is briefly reproduced as follows:

1. Humans can never grasp P; they are cognitively closed to it.
   a. Introspection fails to grasp P.
   b. Physical observation fails to grasp P.
   c. No form of inference from physical observation can lead us to grasping P. *Inference requires data of the same kind as the phenomenon being explained. Humans cannot access non-spatial data regarding the brain. Consciousness is non-spatial. Thus, we cannot discover P by inference.*
2. If humans can never grasp P, then they can never know T.
3. Therefore, humans cannot know T.

III. A problem for McGinn's argument

I will undermine McGinn's argument by showing that his reasoning can be used to argue that we cannot access physical theories that we have good reason to believe have in fact already been accessed. That is, if we apply McGinn's argument to another phenomenon instantiated by a property that humans cannot grasp, then we should conclude that we cannot form a theory that explains how the ungraspable non-spatial property gives rise to its corresponding phenomenon. However, there exist many reputable scientific theories which do in fact explain how a non-spatial property causes a corresponding phenomenon. Since McGinn's argument, reproduced above, is valid, there must be a false premise, and I argue that this is premise 2. Contrary to McGinn, we should *not* accept that a grasp of P is necessary for knowledge of T, as I will argue by means of analogous cases from science and mathematics.

This means that I will not base my argument on a rejection of physicalism. Nor will I take issue with McGinn's point in premise 1 that humans' perceptual capacities are limited to the spatial, which prevents them from truly grasping non-spatial phenomena. Indeed, humans cannot grasp P. However, it is premise 2, which states that if P cannot be grasped, then T cannot be known, that is doubtful. I contend that humans' inability to grasp non-spatial phenomena is not problematic for developing a theory to explain relationships between spatial and non-spatial, such as the relation of brain to mind.

The crux of my argument is this: while humans cannot conceive the *true nature* of certain non-spatial elements of reality, we can conceive of the *existence* of these non-spatial elements and use symbols as placeholders to represent these elements which exist but are beyond access. Symbolic representations of non-spatial things are sufficient to theorize causal relationships so long as humans understand how to appropriately maneuver these symbols in relation with other things. This can best be appreciated by looking at other examples from science and mathematics.

In quantum physics, particles are known to have wave-particle duality. This means that any particle has properties of both a wave and a particle, and it is in virtue of this property that quantum particles have definable probabilities of behaving in certain ways. But here we must point out that this property cannot truly be grasped by any human—it is beyond our cognitive faculties. Wave-particle duality is a property that cannot be faithfully rendered in spatial terms, and humans can only conceive of such abstract concepts in spatial terms. If McGinn's argument is correct, then by parity of reasoning, the fact that humans are unable to grasp the true non-spatial nature of the property that gives rise to particle behaviors should imply that no explanatory theory can be constructed to link the two. Yet such a theory exists: the Schrodinger Equation.

In short, this equation relates the physical properties of a particle to the probability that it will behave in certain ways via a simple mathematical transformation of a probability amplitude, which is an idea expressed as a complex number. Crucially, this theory uses the complex number *i,* defined as √-1, to construct this relationship. I argue that *i* can be understood as a symbolic placeholder that expresses a non-spatial entity that does not exist in the spatially knowable world. To show that *i* expresses non-spatial information, I must point out that our concept of *i* does not directly represent an observable property of the physical world. After all, √-1 does not correspond with an intuitive concept in the physical world—contrast the unreal-ness of *i* with our idea of the number "1"—an idea so fundamental to the physical world that most babies can grasp it. However, *i* nonetheless has a definable relationship to spatially defined reality: taking the complex norm of a complex number produces a real number, which can represent a measurable quantity. Thus, a complex number is an example of a symbolic placeholder for non-spatial information that can nonetheless be related through symbolic manipulations to spatial information. This placeholder functions as a bridge between spatial and nonspatial; it expresses non-spatial information by defining it in spatial terms, thus allowing us to refer to and manipulate non-spatial information in the same expression as spatial properties of particles.

Summarizing, in the Schrodinger Equation, *i* serves as a symbolic placeholder for some non-spatial information we cannot perceive by our senses or fully grasp, but which nonetheless has bearing on physical reality. Since *i* is defined in spatially manipulable ways, it permits the transition from spatially defined features of particles to non-spatial probabilities. Furthermore, *i* is instrumental to the formation of an explanatory bridge between a physical entity (a particle) and non-spatial phenomena experienced by that entity (probabilities of certain particle behaviors). Importantly, this explanatory relationship is constructed without any real grasp of the non-spatial property, wave-particle duality, that gives rise to the probabilistic account of particle behavior.

What this example shows is that there is no pressing need to have a genuine grasp of a non-spatial concept in order to use it in establishing a causal relationship. All we need is to find some way to define symbols that carry parcels of non-spatial meaning in ways that we can manipulate spatially. If the problem we face regarding body and mind is in relating spatially observable brain states to non-spatial conscious states, it seems that there is no need to grasp the particular non-spatial property P; there needs only be a symbolic bridge from spatial to nonspatial.

What does this mean for the problem of P and T? I propose that, in spite of McGinn's argument, it is possible that we will one day be able to construct a symbolic placeholder, analogous to *i*, that allows for the construction of an explanatory theory relating physical brain states to conscious experience. P is a non-spatial property whose true nature we cannot imagine, but it remains possible that we could construct some tools with which to represent it, or a proxy for it, using spatially defined terms. That representation, and its relationships to spatial reality, could serve as an explanatory bridge between spatial and non-spatial. While this possibility does not offer evidence that humans will discover a solution (T) to the mind-body problem, it is sufficient to refute McGinn's reasoning that being unable to grasp P makes it *impossible* for us to know T.

IV. Objections

The objection which may most readily come to mind will be to question the appropriateness of the analogy. This objection may take two forms, to which I will respond in turn.

First, one may object that there is some sense in which the non-spatial nature of consciousness is fundamentally different from the non-spatial nature of some mathematical concepts like *i*. Furthermore, humans are equipped with some sensibility that allows us to understand mathematical concepts like *i*, but no such facility for concepts pertaining to consciousness. The upshot of this objection is that we may be unable to stipulate conditions on a symbolic placeholder that appropriately represents a non-spatial concept pertaining to consciousness. In other words, if *i* is indeed fundamentally more accessible to us than concepts like P, then we would not be able to define a symbolic placeholder for P in the way that we have defined *i.*

For this objection to pose a concern, there needs to be convincing evidence that it truly is the case that *i* and P are concepts of fundamentally different *kinds*, such that we can grasp more of *i* than we can P. However, there is no evidence that *i* is distinctly more accessible to us than P. It may seem that, because *i* is so prominently used in mathematical expression, we must have some grasp of what it is. But what mathematicians claim to understand about *i* is only in virtue of the tools we have used to confine and describe it in spatial terms. As I will show, we do not and cannot grasp the true complex nature of *i*. To see this, consider what it is that we "know" about *i*. At a basic level, *i* has an algebraic definition. We have *defined 'i'* as the symbol such that, when squared, the result is -1. Importantly, although this allows us to 'represent' *i* spatially for certain computational purposes, this does not give us a genuine spatial grasp of *i* independent of the real number system. Consider another form of conceiving *i*: plotting it within the complex number plane, a coordinate system nearly identical to the Cartesian plane used to visualize the real number line. The complex plane offers a way of geometrically illustrating the idea of complex numbers, but it too takes a non-spatial concept and places it on a spatially defined plane. After all, we have no way of knowing what geometric form the complex number line actually takes—constraining it to Cartesian coordinates offers a spatial configuration which we can more easily maneuver in mathematical theories. These mathematical provisions may hint at a concept beyond spatial access but ultimately fail to provide a real grasp of what a complex number really *is*. Given that we have nonetheless stipulated important mathematical properties for *i* despite our utter lack of grasp for complex numbers, it seems premature to assume that we will never define symbolic placeholders for ideas like P, about which we can probably grasp equally little.

Second, one might reject the analogy by appealing to a fundamental difference between quantum particle behavior and consciousness. According to this objection, the two cannot be compared because the former describes the behavior of a particle in relation with the spatially known, physical world while the latter appeals to something more abstract and decidedly non-spatial: conscious experience. More specifically, the Schrodinger Equation describes a particle in terms of its probable location in space and its kinetic and potential energy, and although the equation points at something non-spatial (the relative probabilities of the particle behaving in certain ways), the concepts involved are arguably still more tied to physical, spatially defined reality than the phenomenon of conscious experience. The upshot of this objection is that the Schrodinger Equation might only be available to us because particle behavior is more of a spatial or physically rooted phenomenon than is consciousness. It would follow then that a similar theory might not be available to explain something further removed from spatial reality, like consciousness.

This objection may be addressed in two parts. First, the objection relies on the notion that conscious experience is somehow more removed from the truly "physical" than quantum particle behavior. However, it is dangerous to permit such a hierarchy. This paper, like McGinn's, adopts standard physicalist assumptions. Accordingly, I maintain a conception of consciousness that is wholly derived from scientifically explainable physical phenomena. The view that some physical phenomena are *more* physical than others reflects a failure to internalize the physicalist assumption. That is, if we agree upon physicalism as a basic principle, then it is not possible that one natural phenomenon is more or less 'physical' than another; the phenomenon is simply either a physical process or a non-physical process. As such, the objection should not pose a real problem—if we can agree that quantum particle behavior and consciousness are both physical processes, without regard to their degree of physical-ness, our ability to compare the two is not endangered. Second, the objection also appeals to a sense in which quantum particle behavior is somehow more spatial than conscious states. But I would argue that this hierarchy too is inappropriate. For one thing, quantum particle behavior may not be quite as 'spatial' as it at first seems; we should be careful not to take for granted any definitive spatial understanding of the crucial wave function found in the Schrodinger Equation. The equation's wave function provides constraints on particles' behaviors, including its location in space, but it also reveals less spatially understandable properties, like superposition, the ability of a particle to exist in more than one location at a single point in time before observation. Furthermore, the Schrodinger Equation has prompted several debates over how to interpret it—some interpretations attach spatial meaning to its implications for particle behavior, such as de Broglie-Bohm Theory, while others assign to it more abstract meaning, such as the Copenhagen Interpretation. The point is, it is not appropriate to use mere intuition to defend the fallacious idea that particle behavior is spatial. For another thing, it is not immediately clear that conscious states are as non-spatial as intuition may guide us to believe. The source of this belief may be simple: our personal access to conscious experience may dilute our understanding of it as a physical process. But I caution against the temptation to accept that consciousness deserves special, wholly non-spatial consideration before broaching the question of how it arises.

Finally, I consider the objection of the reader who, even accepting that it is possible for humans to discover T, complains that discovering T without grasping P is not *satisfactory*. That is, even if we discover T, there remains an unscratched philosophical itch to "understand" the mind-body problem using ordinary forms of intuition. I will respond to this by reminding the reader that the problem at hand is not whether we may come up with a digestible intuition as to how physical brain states cause consciousness. Rather, we are concerned with whether it is possible to manufacture an explanatory theory at all. As I have shown here, such a theory remains possible—McGinn's reasoning is not sufficient to show that T can never be discovered. Furthermore, I will remark that if T is indeed discovered, there is no reason to consider this discovery an unsatisfactory outcome—certainly, the itch to grasp the essence of consciousness is not relieved, but many theories within science and mathematics do not provide the layman with easy causal intuitions of the sort desired here. The solution to the mind-body problem has long eluded humans, but this does not mean we must hold it to the standard of providing *both* a scientifically respectable theory *and* a comfortable intuition as to how consciousness works. The construction of a relationship between mind and body, whether or not we have any intuitive grasp of how and why it works, will likely be an impressive and practically useful achievement.

V. Conclusion

The goal of this paper is to show that conceding human cognitive limitations, *i.e.,* McGinn's idea that we are cognitively closed to P, does not mean we must resign ourselves to never discovering causal relationships in the natural world. I also suggest the pertinence of considering spatially manipulable symbols so as to productively discuss non-spatial properties in the context of spatially oriented processes of scientific discovery. As seen in many examples within science and mathematics, this technique has allowed us to successfully overcome the human inability to conceive of many non-spatial elements of physical processes. This is all to say, there is hope: our ability to bridge the gap between brains and consciousness may not have perished with our lack of facility with which to grasp that elusive P.

Works Cited

McGinn, Colin. "Can We Solve the Mind-Body Problem?" *Mind*, vol. 98, no. 391, July 1989, pp. 349–66.