Qeios

Peer Review

Review of: "The Interaction Problem and Mental Causation: A Quantum Field Theoretical Perspective"

Piergiorgio Sensi[1]

1. FISSUF (Filosofia, Scienze Sociali, Umane e della Formazione), University of Perugia, Italy

The goal of Masi's essay, the challenge he intends to face, is to clarify "how an immaterial or unphysical mind can causally interact with a physical body or its brain states, considering that they seemingly belong to fundamentally different ontological categories" in order to offer "a new understanding of mental causation is presented that reconciles the dualist perspective with the probabilistic nature of quantum mechanics." (p.1).

The aim is as interesting as it is ambitious, just as the method initially chosen by Masi is ambitious: namely, to clarify some of the fundamental concepts involved not only in his own perspective but also in the debate that arises between theories stemming from both the philosophy of mind and contemporary physics, particularly that offered by QFT (Quantum Field Theory).

The purpose of my reading is to assess whether (and how) the author's proposed goal has been (adequately) achieved, especially with regard to conceptual clarification.

The author's commendable intention—not to let the discussion run aground on the shallows of materialist reductionism (which, however, every form of physicalism ultimately leads to, including the one within which Masi himself seems to operate)—makes his contribution very stimulating.

As is well known, materialist reductionism does not pose the problem of possible interaction between two "heterogeneous" entities, since it admits (postulates, believes by faith) the existence of a single substance, namely the material one; therefore, it attempts to reduce every mental activity to the physical substrate that supports it (in the case of neuroscience and its analysis of every "mental" activity, everything is traced back to the electrochemical activity of the brain).

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It is clear that within such an approach, the main purpose of research and studies concerning the interaction between mind and brain is to explain how (not why) brain activity can account for those functions traditionally attributed to the mind. In the reductionist logic, there exists only one substance, one substrate, one "structure" (that of the brain), and all "functions" must be traced back to it. And brain activity follows the laws of physics.

Now, Masi is on solid ground in showing that contemporary physics deals with entities that are difficult to categorize as "material": consider, for example, force fields, quantum oscillations, multidimensional spaces, strings... Whether this consideration is sufficient to "ground" and "demonstrate" an actual interaction between non-material and material entities, however, remains to be proven.

Masi's intent is to situate the possibility of explaining the mind-brain interaction within a physical "ontology" provided by the Quantum Field Theoretical Perspective (QFT); and it is within this perspective that the conceptual clarification Masi deems (rightly) fundamental becomes necessary, a task to which he devotes the entire first part of his work (Chapter II of the essay, "When Words Matter: Pursuing Conceptual Clarity in Light of Contemporary Physics"). The extensive analysis (pp. 3–14) focuses on several key concepts, each of which is treated in a separate paragraph: these concepts are, in order: "Immaterial" (pp. 3–5), "Unphysical" (pp. 5–9), "Interaction and Substances" (pp. 9–13), and "'Non-Spatial' Substance" (pp. 13–14).

Masi succeeds in showing how these notions, within the QFT perspective, turn out to be less rigid than those offered by quantum mechanics. Nevertheless, some perplexities remain. Statements such as: "However, one does not need to pin down rigorous definitions to recognize that physics is replete with entities that are 'immaterial' yet nonetheless real, concrete, and not 'unphysical'" raise problems. The observation that even in quantum mechanics, and in physics as a whole, non-material entities are recognized, though not for that reason unreal or non-physical, is not sufficient. If "the words matter," the words must be defined clearly, in the least ambiguous way possible; otherwise, the arguments built upon them inevitably fall into what in logic is called the "pseudo-Scotus theorem": *ex falso sequitur quodlibet; ex ambiguus sequitur quodlibet.* Popper's lesson, well known to Masi, requires that scientific theories be "coherent," otherwise they are unfalsifiable, and to be coherent they must rest on premises that are as unambiguous as possible.

The definitions and distinctions between the concepts of *Immaterial, Unphysical, Real,* and *Substance* should have been clarified with greater accuracy. In other words, if one wishes to redefine the regional

ontology of the phenomenon under study and is convinced of the inadequacy of the starting definition, one cannot afford to be too approximate.

The same consideration applies to the distinction between "'physical,' 'unphysical,' [and] 'metaphysical'" (p. 5). Yet even in this section, one encounters statements such as the following, which cannot fail to raise perplexities: "On the other hand, there is no universally accepted definition of what constitutes the 'physical,' nor is there a clear distinction between physics and metaphysics or an agreement on the foundational doctrines of physicalism. The term 'physical' varies in interpretation depending on the context..." (p. 5); and shortly thereafter: "The aim of this section is not to provide a definitive answer, as, even in physics, there is no unique and rigorous characterization of the physical appropriate for mind-matter conjectures" (p. 6). It is legitimate to limit oneself to the QFT perspective, but even in this case, a greater disambiguation of certain conceptual knots would not have been inappropriate.

Furthermore, if we accept the definition of *unphysical* as a concept that "does not carry a metaphysical implication" because it "usually refers to meaningless solutions of differential equations" (p. 6), it is clear that defining the "mind" as an "unphysical substance" generates paradoxes. The mind is not unphysical, but only immaterial—or perhaps even "metaphysical"?

If "we can consider quantum fields [from the QFT perspective] the foundational fabric of what we refer to as 'physical' reality" (p. 7), and if "in QFT the laws of physics are determined by symmetry conditions, and causality refers to the interaction of fields constrained by a relativistic microcausality condition," then we can indeed open up the theoretical space for defining a possible interaction between entities that are "immaterial" but nevertheless physical. Yet this is not enough: some indication must be given as to what kind of "physical but immaterial" substance the mind might be; otherwise, the conceptual space thus opened remains empty.

Statements such as: "The question of whether wave functions are operator-valued and 'physical' objects or merely abstract mathematical tools devoid of ontology is ultimately a matter of personal philosophical preference" (p. 8) sound somewhat odd in the work of someone seeking to ground the possibility of physical interaction between mind and brain. The echo of Feyerabendian positions (*anything goes*) is somewhat unsettling.

If "there is only a complex interaction of fields that manifests through a localized exchange of forces in space and time" (p. 11), then more precise indications should be given as to what kind of "field" the mental is supposed to constitute.

The central passage, which opens the space for the second part of the work, is undoubtedly this:

“The curious aspect of QFT is that the ‘substances’ involved (massless or massive particles) and their interactions are ultimately both manifestations of quantum fields. In QFT, all interactions are understood as being the exchange of force-mediating particles between other particles, both of which are described as excitations of fields. No clear distinction exists between substance and interaction; both are made of the same object.” (p. 12, italics mine).

If the object is one, we are in full “Spinozist monism”: particles and interactions are “modes” of a single substantial reality. If this were true, it would then be clear that the mind–brain interaction is not only theoretically understandable but also investigable. But is this assumption sufficient to explain it? Or does one simply resort to postulation?

The last part of the article (*Causality Without Interactions*) opens with this satisfied statement: “Now that we have clarified the context in which the interaction problem must be thought to be embedded according to our current understanding of the physical world, we can see new avenues for conceiving of mental causation” (p. 14).

The new avenues that emerge are those opened up by the indeterminacy of quantum mechanics, into which Masi does not hesitate to insert a quasi-Schopenhauerian “will of Nature”: “the possibility that Nature may ‘choose’ which events within a state of potentiality will manifest into actuality and when that will happen” (p. 15). If “Nature” (written, for some reason, with a capital letter and introduced without an adequate definition—does it stand, perhaps, for the substantivization of the “totality of what exists”?) can “choose” and bring about one thing rather than another, then it is endowed with consciousness and intentionality, as well as free will. But again: is this *demonstrated*, or is it simply postulated?

This “Nature” endowed with mind and free will, which operates within the indeterminacies of QFT, does it follow a logic? Does it act in an entirely gratuitous manner? Quantum indeterminism leaves more room for “chance” than for “cause.” A conscious, intending agent, on the other hand, follows decision-making processes that seek/claim to determine events. To what extent can “stochastic selection,” even if it may display traits of (indeterministic) “freedom,” resemble arbitrariness, that is, an intentional and intending will?

Masi is clearly aware that this Nature endowed with mind and free will constitutes a “panpsychist” conception, which he defines as “libertarian quantum panpsychism” (p. 18). Such a conception (and Masi is aware of this) could be regarded as an act of faith—at most, a metaphysical postulate. Certainly, and

here I agree with Masi, “Nothing in the known laws of physics prevents us from entertaining such metaphysical speculation”; indeed, to invoke Popper once again, such metaphysical postulations may even guide research and perhaps become heuristically productive. Yet they cannot, as of now, define a genuinely explanatory theory.

“How an immaterial or unphysical mind can causally interact with a physical body or its brain states” (p. 1) thus remains a “mystery.”

Declarations

Potential competing interests: No potential competing interests to declare.