Rethinking the Mind-Body Problem
Language, Interoception, and the Foundations of Subjectivity

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1 Mind-Body Problem

The mind-body problem arises from the need to understand how two apparently different substances – *res cogitans* and *res extensa* – can interact with each other. The concept of mind encompasses all human intellectual and emotional processes and, in everyday language as well as in philosophical tradition, is conceived as immaterial and intangible. If we presume that the mind and the physical world are two distinct things, however, what emerges is the need to explain how mental states – such as desires and intentions – can play a causal role in our actions. In line with the Cartesian approach – and despite different theories having attempted to provide an explanation for the mind-body problem – consciousness and the debate around it also seem inevitably to fall within the domain of *res cogitans*. Thus, because the physical states of the brain do not correspond to the conscious states of the mind, consciousness and brain cannot be explained interdependently. Consequently, consciousness would not be scientifically investigable, as it is expressed by the subjectivity of the individual.

Instead, materialism holds that our mental states are nothing more than physical processes taking place in the brain and there would be no real distinction between mental and physical states. In fact, materialism does not aim to reconcile the materialistic nature of the world with the non-materialistic nature of mental phenomena. This perspective originates from the problem of mental causality: if it were true that mental states are distinct from physical states, then they could not have causal effects on the physical world. Consequently, the ontological distinction between *res cogitans* and *res extensa* cannot exist and it must be concluded that mental states are, in fact, states of a physical nature. However, this perspective has been criticised because, rather than providing an explanation for the subjective nature of experience, it ignores it. Authors such as Frank Jackson (1982) and Joseph Levine (1983) have highlighted an explanatory gap in this theory, as it does not explain how a certain neural configuration can give rise to subjective experience. Therefore, in the words of Chalmers (1995), materialism does not solve the "hard problem of consciousness".

A different direction is that of computational functionalism, which has led classical cognitive science towards the mind-computer metaphor: a mind that begins to be identified with the ability to manipulate symbols and representations. For functionalism, a mental state is a functional state, which can be identified through its relationships with other states of the organism (Putnam, 1960). A state such as physical pain, for example, can be described in terms of function, i.e. as caused by physical damage and generating avoidance or repair movements to repair the damage suffered. However, this theory ignores aspects of sensory experience and its embodied dimension. In fact, thinking about the mind in physical terms does not seem sufficient to conceptualise human conscious experience, whereas the manipulation of symbols is incomplete because it ignores the investigation of the relationship between mind and body (Re, 2025).

The proposal of this article is that there is a distinction between *res cogitans* and *res extensa*, but that it is purely conceptual and linguistic. In other words, the linguistic domain of the mind has always been characterised by abstract and intangible vocabulary, which makes it particularly complex to understand what role physical processes actually play in everything we call mental. Mental processes are not entities separate from the body, but rather manifestations of complex bodily dynamics, among which interoception, or the perception of the body's internal states, is certainly worth mentioning. Although the sensory system of interoception has been less investigated, it may represent a real link between mind and body, which thus become sides of the same coin. Also reinforcing this perspective is the hypothesis that the perception of bodily states plays a crucial role in the construction of a basic form of self-consciousness. The mind-body problem is thus not a question of how two distinct entities can interact with each other, but how consciousness can emerge from the continuous processing of physiological states. According to Denton (2009), consciousness would initially emerge as an evolutionary adaptation mechanism with the function of monitoring our internal states. Following this reflection, interoception would not only be a fundamental system for maintaining bodily balance but would also mark the dividing line between an organism functioning through automatic mechanisms (stimulus-response) and an organism endowed with consciousness and flexible cognitive abilities, adaptable to different internal and external conditions.

2 Is the mind-body problem a linguistic problem?

Could the mind-body problem be a linguistic problem? The idea is that the evolution of language may have played a central role in its very formulation, a problem very close to the materialist thesis that asserts the existence of a single reality, in which mind and matter are two aspects of a single substance. According to Friedland (2015), the modern lexicon can be divided into two macro-categories: *reflective* and *introspective* words. The former are used to describe what exists outside of us, which can be perceived and measured. The latter, on the other hand, refers to what happens inside us, what has no unambiguous counterpart in the real world and is experienced subjectively, such as dreams, emotions, memories and thoughts. In other words, the source of reflexive terms lies in perception, while the source of introspective terms lies in sensation.

According to Friedland's (2015) analysis, Descartes postulated the mind-body problem in a historical era that made such a conceptualisation possible, if not inevitable. During the scientific revolution, in fact, the language of scientists began to differ markedly from that of philosophers, who instead turned their attention to more intimate and personal issues. It was precisely the scientific revolution that triggered a philosophical reflection on man and his role in relation to nature, leading to the beginning of a propulsive drive for intimate enquiry that culminated in 1800 with Romanticism. This process led to the emergence of many terms that fall within the semantic field of thought, feeling, and intuition (Friedland, 2015). In other words, this evolution of symbolic language has deepened the rift between the physical and the mental.

Friedland's hypothesis, however, does not clarify the role of the bodily dimension in language construction. In short, Friedland divided language into two categories. This article aims to expand on his thinking by identifying interoception as the basic mechanism behind this division. In other words, bodily sensations perceived through interoception, as they are "internal", are processed verbally using introspective words. Neurophysiological literature also shows that interoception is precisely the bridge that connects bodily states with consciousness and could therefore represent the basic process of such linguistic elaborations. Today, however, there are sophisticated tools that can give us a real-time picture of what is happening in our bodies in terms of neurophysiological changes and nervous system activity. Moreover, the most recent scientific advances have enabled us to verify that at the

basis of objective experience and perception there are processes of a physical nature that are no different from those that determine subjective experience.

Therefore, the distinction between objective and subjective reality, would be a linguistic but not a natural dichotomy. In other words, Friedland's (2015) argument leads to the hypothesis that the mind-body problem could be a cultural construct born out of the evolution of language. If we consider this hypothesis plausible, the way of approaching this problem should also be questioned. The central point is that our mental experiences do not seem to have a direct counterpart in the physical world and this creates a separation, at least apparent, between mind and body. But if this separation is a result of our linguistic categorisation, then perhaps we should review the way we think and talk about the mind.

Since the mind-body problem lies in the evolution of language, it should be addressed without resorting to a new metaphysical model, but through a linguistic revolution based on restructuring the way we speak and conceptualise the mind itself. In fact, an interesting perspective that represents a natural bridge between bodily processes and mental phenomena could be that offered by an often overlooked sensory system, such as the interoceptive system, which seems to offer a concrete basis for overcoming the rigid dichotomy between mind and body and explaining subjective experience without resorting to dualistic categories.

3 Interoception and Bodily Self

The proliferation of research within an approach known as Embodied Cognition (EC) has represented a revolution. But what do we mean by Embodied Cognition, and on which assumptions is this research program based? First of all, on the idea that many cognitive processes are realized through the body's control systems (Caruana and Borghi, 2013). Secondly, on the assumption that perception, action, and cognition are not distinct and separate domains, but are closely interdependent.

Despite the growing interest in the embodied cognition paradigm leading to an extensive exploration of the body's role in cognitive processes, exteroceptive modalities have been investigated with more attention than interoceptive ones (Re et al., 2023). The concept of interoception has its roots in the embodied mind theory (Varela, Thompson, and Rosch, 1991), which argues that all forms of cognition, even the most complex such as abstract thinking and reasoning, are the result of specific bodily processes.

According to neuroscientists, interoception can be defined as "the sense of the physiological condition of the whole body" (Craig, 2002). The perception of bodily states seems to play a crucial role in many, if not all, mental processes, such as in the case of self-perception and self-awareness. For instance, according to Damasio (1999), self-consciousness emerges from visceral signals. Essentially, the memory of one's bodily experiences allows the individual to know themselves, identify themselves, remember past perceptions and actions, and predict what future ones will be.

Interoceptive awareness, in this sense, seems to play a crucial role in the establishment of an early basic form of self-awareness, which is also capable of driving more complex cognitive processes but all emerging from bodily mechanisms that interact at multiple levels (Re *et al.,* 2023).

This is supported by a well-known experimental study aimed at investigating the emergence of the sense of ownership over the body. In the rubber hand illusion (Botvinick and Cohen, 1998), it is possible to generate an illusory sense of ownership toward an external artifact (Re and Perconti, 2024). By simultaneously stimulating with a brush the hand of the participant, covered by a panel, and a rubber hand positioned within the participant's view, it is possible to induce in the subject the feeling that the rubber hand belongs to them.

This is an experiment that mainly highlights the role of the visual, tactile, and proprioceptive modalities in the perception of one's bodily self. The experiment conducted in 2011 by Tsakiris, Tajadura-Jiménez, and Costantini, and reported by Tsakiris and De Preester (2018), however, demonstrates the existence of a complementarity between interoceptive and exteroceptive processing in the emergence of the bodily self. It emerged, in fact, that participants who experienced a strong sense of ownership toward the rubber hand achieved low results in the task of detecting their heartbeats, which indicates the individual's interoceptive accuracy. In other words, it seems that information about our bodily self comes from exteroceptive and visceral and interoceptive information.

From an anatomical perspective, the link between interoception and the sense of self could be attributed to the activity of the interstitial cells of Cajal (Sanders, Koh, and Ward, 2006), pacemaker cells located in the gastrointestinal tract that transmit low-frequency electrical impulses to the central nervous system; these would serve to track the rhythm of the gastrointestinal tract's contractions at all times. Similar pacemaker cells are also found in the heart and seem to perform the same monitoring function.

The role that interoception plays in mental processes is clearly not limited to the sense of self; Damasio (1999), in fact, argues that emotions also emerge from the brain's ability to monitor and respond to bodily signals, and that subjective experience is interconnected with physiological activity. From this perspective, the mind-body problem is not so much a question of how two distinct entities can interact with each other, but rather of how consciousness can emerge from the continuous processing of physiological states.

The predictive brain theory (Seth, 2013) suggests that the mind is the result of an active inference process in which the brain makes representations of the world based on signals from the body and the environment. Interoception plays a key role in this process, as it provides constant information about the internal state of the organism and helps to modulate perception, emotions, and self-awareness.

If consciousness is the result of the integration between bodily signals and brain activity, the mind-body problem could therefore be reframed not in terms of separation between two entities, but as a problem of connection and organization between different levels of biological processing. This would also have an evolutionary explanation. According to Denton (2009), consciousness initially emerged in the form of primordial emotions such as hunger, thirst, and the need for air, understood as forms of activation accompanied by the intention to act. This primordial form of consciousness would have allowed us to maintain homeostasis, (i.e. the ability of living organisms to maintain a stable internal environment) despite changes in the external environment. These emotions are generated by interoceptive mechanisms involved in the regulation of basic functions, activating the phylogenetically oldest areas of the brain. Denton's (2009) hypothesis is that these primordial emotions – originally related to the need for adaptation to the environment and the fulfillment of the most basic needs – later gave rise, in an evolutionary stage, to the development of more complex forms of consciousness. These primordial emotions, aimed at maintaining homeostasis, are filled with subjective sensations.

According to Denton (2009), self-consciousness initially emerged from the need to decode one's internal and bodily states in order to act to satisfy primary needs. At first, awareness of sensory flow and subjective states related to one's internal world would have performed a monitoring function of homeostatic systems, then gradually projected itself onto the external world (Assenza, 2014). This initial function of internal monitoring thus played a key role in the evolution of consciousness itself and in the development of the complex forms of consciousness that were later conceptualized.

In summary, interoception not only contributes to our sense of self, but is also the basic affective mechanism for the construction of linguistic categories. In other words, the perception of our

physiological states gives us information about ourselves, determines our experience, which is then transformed into language, particularly introspective vocabulary.

Craig's interpretation of interoception as a system for monitoring homeostatic states also opens up the possibility of conceptualising emotions as proto-symbolic acts, i.e. expressions of physiological changes. From this perspective, the symbolic value of emotions could lie in their ability to encode bodily states, providing a substrate for their verbal expression. This is in line with theories that consider language as an evolution of affective expression and bodily regulation (e.g., Damasio, 1999; Panksepp, 2005), suggesting that the semiotic properties of language may be rooted in the visceral functions of the body.

While the focus of this article has been primarily on self-consciousness as emerging from interoceptive processing, the transition toward other-consciousness – or the perception of other minds – can be hypothesized through a mechanism of analogical projection. This means that the subject, by first internalizing and recognizing bodily-affective states as self-related, projects similar structures onto other bodies perceived externally. Although this mechanism requires further empirical and theoretical support, its plausibility is grounded in developmental psychology: infants first construct a bodily self and then progressively attribute similar affective states to others (Gallagher, 2000; Rochat, 2003). However, the projection from inner to outer is not naive or purely analogical; it is mediated by bodily mirroring mechanisms and cultural-linguistic scaffolding, which contextualize and stabilize such inferences about other minds.

However, the link between self-consciousness and other-consciousness remains a limitation of this article, as it is primarily based on speculation and requires further investigation.

4 Conclusion

This contribution has analysed the mind-body problem from a perspective that considers the mind as intrinsically connected to the bodily dimension. Although numerous theories have attempted to address the mind-body problem, it is rare that the origin of this dichotomy has been traced back to language and the use of linguistic categories that have progressively established a separation between mind and body. In particular, it seems that the difference in the way we conceptualise objective and subjective experiences has led us to classify the external world according to categories distinct from those used to describe our inner world, thus leading us to perceive the mind as an entity separate from the body. This is because our inner experiences are so steeped in subjective experience that they have allowed the development of a reflective and mentalistic vocabulary that has greatly expanded our linguistic awareness of our subjective experiences. However, despite the subjectivity expressed by our inner experiences and the language used to refer to them does not necessarily imply that the source of those experiences resides in entities or principles other than those that characterize the physical world and objective experiences, the mind-body problem has emerged as one of the most complex and debated philosophical issues.

The development of language has contributed to creating a distinction between the external world, understood as events that happen outside of us, and the internal world, i.e. the sensations and emotions we feel inside, thus laying the foundations for dualism. However, subjective experience could be explained by resorting to neurophysiological processes and mechanisms rooted in the corporeality of a cognitive agent. Therefore, it is no longer a question of understanding how two substances – mind and body – can interact with each other, but rather of explaining what we call mind without resorting to a metaphysical and abstract domain disembodied from the external world.

Reconceptualizing the disembodied mind implies looking at the body from a different perspective, ascribing to bodily subjectivity a role that is no longer the prerogative of an "I" decoupled from its

bodily substrate, but rooted in it (Malvica and Re, 2019). From this perspective, bodily processes thus become intrinsically connected to cognitive and affective functions in human beings (Balconi, 2019). Although further research is needed, rooting the self in visceral physiological states (Denton, 2009., Monti *et al.,* 2022) could provide us with a unified view of understanding what the mind is to us. On the other hand, the stability of interoceptive processes with respect to the malleability of the exteroceptive self (Tsakiris, 2017) is a finding supported by numerous experimental evidence, such that interoceptive processes are attributed a solid foundation for self-awareness. In fact, interoceptive awareness allows us to perceive ourselves in a continuous and consistent manner, creating a stable basis for understanding how self-awareness is constructed and maintained over time. Although this approach may not provide direct answers to the difficult problem of consciousness, namely why and how subjective experience arises, it reframes the question by rejecting the dualistic search for the mind outside the body, basing consciousness on lived and embodied experience.

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