

Psychoneuroimmunology and the embodied mind

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One of the major philosophical aspirations in contemporary consciousness research is to find a framework of explanation that could successfully address the problem of mind-body relations. Descartes is often regarded as the father of dualism in modern philosophy of mind. Phenomenology and embodiment may dissolve the problem of dualism in the waters of the experiential features of the life-world and the subject. Recent findings in psychoneuroimmunology have shown that somato-psychic mechanisms exist through which bodily stimuli are translated into neuropsychological events resulting in alterations in certain behavioral patterns. These may as well include changes in the qualitative features of the lived body (Leib) resulting in an overall change in the subjective experience. The application of modern embodiment theories in life sciences has the potential to create a novel, fruitful and heuristic approach, which may help us unveil features of the "mind-body phenomenon" that have been hidden so far. In this paper, I will try to briefly outline a possible analytical framework on the grounds of classic – Husserlian and Merleau-Pontian – phenomenology and biomedical sciences.

**phenomenology, embodiment,
embodied cognition,
psychoneuroimmunology,
naturalized phenomenology**

PSZICHONEUROIMMUNOLÓGIA ÉS A MEGTESTESÜLT ELME

A kortárs tudat kutatás egyik jelentős filozófiai törekvése egy olyan magyarázati keretrendszer létrehozása, mely sikeresen képes megbirkózni a test-tudat viszony filozófiai problémájával. Descartes gyakran mint a dualizmus atyja jelenik meg a modern elmefilozófiában. A fenomenológia és megtestesült elme irányzatai talán képesek feloldani a dualizmus problémáját az élet-világ és a szubjektum tapasztalati jellemzőinek vizeiben. A pszichoneuroimmunológia legújabb eredményei szerint léteznek olyan szomatopszichikus mechanizmusok, melyeken keresztül egyes testi stimulusok ideglélektani történésekké transzformálhatóak, ezzel megváltoztatva az egyén bizonyos viselkedési mintázatait. Ezek a változások maguk után vonhatják a megélt test (Leib) minőségi jellemzőinek módosulását is, a szubjektív tapasztalat változásával egyetemben. Az élettudományok és a megtestesült elme modern elméleteinek együttes alkalmazása olyan új, gyümölcsöző és heurisztikus megközelítési módok létrehozásához vezethet, melyek segíthetnek a „test-tudat jelenség” mindeddig ismeretlen jellemzőinek feltárásához. A jelen tanulmányban röviden kísérletet teszek egy olyan vizsgálati keretrendszer létrehozására, mely – Husserl és Merleau-Ponty nyomán – a klasszikus fenomenológiai gondolkodáson, és a kortárs orvosi-biológiai kutatások eredményein alapul.

**fenomenológia, megtestesült elme,
megtestesült kogníció,
pszichoneuroimmunológia,
naturalizált fenomenológia**

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Érkezett: 2015. szeptember 17.

Elfogadva: 2015. október 1.

According to the modern philosophers of mind, a reasonable theory about consciousness must include – at least – two main features: i) it must take the first-personal givenness of consciousness into consideration,

moreover, ii) it has to account the difference between self-consciousness (our awareness of ourselves) and consciousness-as-an-object of examination. Such a theory must take into account and be able to explain the difference



between *self-consciousness* and *intentionality* (defined by the epistemic contrast that stands between the subject and object of experience). Based on *Kant's* and *Schopenhauer's* ideas, *Franz Brentano* claims that all “psychic phenomena” (i.e. mental states) are always conscious of something (object), that is they have *intentional directedness* (1, 2). This intentional directedness or intentionality is an important feature of human consciousness as introduced by Brentano in the 19th century. Brentano provides a context favorable for the analysis of Edmund Husserl's and Maurice Merleau-Ponty's works. He not only emphasized the intentional nature of human consciousness but also pointed out the ways descriptive psychology could help to describe and explain different intentional mental states. In the following, I will first discuss the major characteristics of phenomenology and embodiment, then focus on the plausible applications of this philosophical approach in the analysis of brain-immune interactions. The aim of this paper is to seek for possible implications of phenomenology and embodiment in consciousness research and in multidisciplinary investigations concerning the mind-body problem and psychosomatics.

Husserl's phenomenology: reconsidering the mind-body problem

Husserl believed that the emergence of Cartesian dualism was a critically important point in the history of philosophy, however, he also contended that Descartes did not accomplish his own work. Husserl's main argument aims Descartes' method of radical scepticism: Descartes assumed a dualism between the pure ego and the physical world. Husserl, in turn, questioned how did this dualism acquire its self-evident status? He concludes that Cartesian dualism resulted from “abstracting away from experience to arrive at the notion of a physical world, which was to be described rationally by means of the language of pure mathematics” (3). This is exactly the manner how natural science examines the physical world, and – in this sense – Descartes followed the way of Galileo. However, Descartes did not extend his methodological doubt to this scientific way of cognizance and, therefore, was not able to suspend it. Thus the Cartesian ego could not transcend the worldly preconceptions (4). Husserl's aim with his phenomenological method is to execute the *epoché* without getting epistemologically engaged with the naturalistic

attitude. Rather he added the concept of “life-world” (*Lebenswelt*) ousting the naturalistic attitude from phenomenology. Husserl wanted to create a new philosophical project that produced a proper *transcendental analysis* for studying the intentional structure of subjectivity. This method would allow one to examine the way intentional objects are constituted in experience. However, the wholeness of the experience cannot be fully separated from the body, since – as we will see – the body itself emerges as an interface between the life-world and the subject.

Naturally, when we conceptualize phenomenal consciousness from a scientific point of view, we basically have two options. We can observe phenomena as a naturalist scientist or from the *life-world's* point of view. The naturalistic way involves a special perception of the physical world: Husserl indicated that – in this mode – humans and animals appear as divided beings possessing two ontological “layers” (mental and physical), both which can be examined on its own, unique way. Husserl rejected the naturalistic approach exactly on the same grounds as he did in case of Cartesian dualism. He purported that this picture has already involved the existence of a physical world, separated from and independent of the mental realm. In transcendental phenomenology, however, we do not make abstractions when discussing about “souls” rather we start with the examination of “how souls – first of all human souls – are in the world, the life-world, i.e., how they ‘animate’ physical bodies” (5). This means that from transcendental investigation the role of body is not necessarily excluded. In contrast, the descriptive psychology of his contemporaries, including Brentano and Dilthey, mostly applied the naturalistic, Galilean-Cartesian method, therefore: “There can no longer be a descriptive psychology which is the analogue of a descriptive natural science.” (5) Husserl strongly criticized empirical psychology particularly because of its misguided, naturalistic approach to consciousness (3). This unreasonable approach rooted in the attempt to phenomenologically characterize the intentional objects of consciousness that would inevitably lead to the realization of Brentano's and Dilthey's inadequate methodology (i.e. the conception of inner versus outer perception would not suffice as a fundament for psychological research). The remedy, for Husserl, could lie in the heart of his phenomenological method: it reports not only about the *contents* of consciousness, but provides a vast understanding about the features of intentional mental states. Eventually, argued Husserl, this method could result in the

attainment of *synthetic a priori principles* that are essential in the constitution of human conscious states, and even lead to the collection of empirical data concerning intentional mental states. Husserl in his *Phenomenological Psychology* (1977) admits that our body is the “unity of perceptual organs” and we can see bodily phenomena from the aspect of spatial extension and subjective internality (6). In *Thing and Space* (1997) he speaks about the so called Ego-Body and comes up with the example of riding to demonstrate the co-constitution of the Ego-position, the inner kinaesthetic sensations, and the environment (7). By these ruminations he declares the *situatedness* of being and cognition.

The Cartesian division of body and mind, in Husserl’s opinion, was a great misunderstanding. From the Galilean-Cartesian point of view we obtain a basically naturalistic idea of consciousness, a complementary explanation as it appears in modern science. Husserl pointed out that the only way out of this misunderstanding is to notice and make completely clear that this Cartesian “physical objectivism” has a counterpart in the form of “transcendental subjectivism” (8). This is how Husserl connects Descartes with Kant’s transcendental idealism. Although transcendental subjectivism also has its origins in Descartes’ philosophy, it culminated in the “truly” transcendental philosophy of Kant where consciousness is not considered as a “complementary part” of Nature, rather as a transcendental-constitutive fundament of all existence (including the physical world). Husserl criticized Kant’s transcendental philosophy as it was built on *Leibniz*’s system and misinterpreted its intuitive/perceptual characteristics. Consequently, this led to an essentially misguided transcendental inquiry where the investigation starts with geometrical “facts” about the physical world and then create “mythical constructions” (Kant’s transcendental psychology) to make an explanatory frame to support this fact. “Kant’s unexpressed ‘presupposition’”, argues Husserl, is specifically “the surrounding world of life, taken for granted as valid” (5). Only transcendental phenomenology – through its systematic *bracketing* – could penetrate into this “pre-given life-world” to express a fully coherent and scientific transcendental philosophy (8). The life-world, as discussed above, is, in fact, the world as it *appears to us* in our experience, through our own subjective perspective. The world as it is *experienced/lived by us*, populated by physical objects, bodies, etc. We ourselves are embodied and are in interaction with other physical beings in our spatiotemporal environment. It also includes vari-

ous intentional activities which could be as complex as arts, sciences, and so on. Importantly, this life-world also contains other human beings who may interact with me or with whom I may interact in order to get engaged in several – collective – activities, so it is an essentially intersubjective realm with all the collective cultural and historical aspects of human existence and history. We find many allusions in Husserl’s main work to the fact that the *world of actual experience* is always *intersubjective* (5). Human subjectivity both means a way of existence as a subject *for* the world (transcendental subjectivity), and a form of existence as an object *in* the world. Thus, for Husserl, the world itself is constituted by a historically situated and embodied transcendental subjectivity (9). Sartre and Merleau-Ponty both appreciated his position on embodiment: Husserl’s intentionality is always spatiotemporally instantiated (i.e. in a given medium or setting, location, situation, etc.) including both the body and the mind. When, for instance, I am reaching out to grab my coffee mug, I only focus on the subjective givenness of the mug (and all the life-world objects surrounding it). This subjective givenness of my coffee mug – within my experiential life-world – is constituted by many components: visual experiences (the sight of the mug) are correlated with several kinaesthetic experiences (touching the mug, feeling its weight, feeling my body *as it is moving* towards it). Life-world objects are, therefore, always intentionally correlated in my experience, and the body (broadly speaking “embodied cognition”) has a *phenomenological interface* role here. That is, I cannot separate my self from my body as both have an *immanent transcendental function* in the constitution of my life-world.

Importantly, for Husserl, addressing the “body” primarily means the *lived body* (*Leib*), and not the *biological-physiological body* (*Körper*) as a material object. Concerning the old problem of Cartesian mind-body dualism, he purports that what is actually standing against the material body is not the soul, but a *concrete unity of soul and body*, i.e. the *human subject* (4, 10). But his reference to the unity of soul and body does not exonerate his system from being essentially dualistic [Descartes argues likewise: “I am not merely present in my body as a sailor is present in a ship, but that I am very closely joined and, as it were, intermingled with it, so that I and the body form a unit.” (11, 12)]. Husserl’s notions of the psychophysical unity of human beings are frequently re-conceptualized in his later works where “the concept of a person is logically prior to that of an individual con-

sciousness”, therefore his “distinction between the lived body and material bodies is not enough (...) to overcome the conceptual dualism underwriting his project” (10). In summary, for Husserl, the intentionality of the body is a sort of transitional phenomenon located somewhere between the objectiveness of reality and the subjective experience of the self. The body is not an object itself, rather a “quasi-thing” owned and operated by a disembodied transcendental ego that uses it as the very placement of its subjective sensations.

Merleau-Ponty’s novel phenomenology of the body and mind

Since the middle of the twentieth century Maurice Merleau-Ponty’s phenomenology has been an absolutely critical component of contemporary inquiries concerning human consciousness. Besides philosophers, many neuroscientists and experts in cognitive psychology read and cite his works, as well. Thus he can be considered as one of the most important initiators of the interdisciplinary dialogue between phenomenology and cognitive sciences that lead to the establishment of the theory of embodied consciousness and its practical-therapeutic implications (in “naturalizing phenomenology”). His philosophy is mainly built on the grounds of Husserl’s and Brentano’s works, but Gestalt psychology and neurology was also crucial for him. In his phenomenology, perception has a central role in engaging with the world and apprehending its aspects. Merleau-Ponty strongly emphasized the *role of the body* in *knowing the world* and he thereby reformed the old tradition that regarded consciousness as the only source of knowledge. He upheld the idea that the body and that which it observed are essentially the same, an idea that stands very close to *Schopenhauer’s* philosophy (13). Including embodiment – as the dominant element – in his philosophy caused him to deviate from the path of his teachers and predecessors, such as Husserl’s phenomenology. He replaced “traditional phenomenology” with what he called the “indirect ontology” of “the flesh of the world” (14).

The phenomenological framework of Merleau-Ponty’s system presupposes that consciousness is *necessarily embodied*. Thus, in contrast to Descartes’, Leibniz’s, Kant’s or Husserl’s approach, he is not focusing on immaterial substances, abstract and intangible egos, mental contents, etc. Instead, in the very center of

Merleau-Ponty’s inquiry stands the body acting in and orienting itself in its surrounding environment (world) in an expressive manner. The transcendental self, says Merleau-Ponty, was regularly and falsely identified with inner agents in modern philosophy; however, it is actually connected and related to the outer (objective), intersubjective world by an intricate web of intentionality. Merleau-Ponty, in the footsteps of Husserl, argues that the thinking ego should not be viewed as a “homunculus” but must be interpreted as an essential, structural characteristic of experience (15). Moreover, his philosophical analysis of intentionality shows that the directedness of intentionality flows from the perceptual experiences to the various actions of the *lived body* (i.e. movement, affect, etc.), the perceiving-moving body with all its sense organs, which are incessantly linked to perceptions directed at objects/occurrences of the environment. These preconceptual modalities of mental states inherently possess a form of directedness (as opposed to the intentionality of, e.g. decisions or judgments). These conscious states always involve the lived body of the perceiver (15, 16).

In Merleau-Ponty’s phenomenology, embodiment (or “corporeality”) has nothing to do with the functional processes as described by neurophysiologists or medical researchers (15). The body not only plays a role in the emergence of perceptual objects in our field of consciousness but – to some extent – also manifests itself in it (17). This “some extent” means a significant contribution to the overall process of phenomenological experience. For instance, while driving, I try to avoid an impact with a tree in a turn of the road. The thematic object in this case is the tree coming towards me quickly, but this experience has also many other negligible elements (mostly marginal objects, such as the color of the flowers around the tree, a rabbit in the distance, clouds on the horizon, etc.). Additionally to the thematic and marginal objects, I am also experiencing my own living body: it appears not as the center of my thematic attention but as an essential point of orientation and something through which I embrace the world. My body remains with me permanently, *inserts* me in the world cognition-wise, never disappears from my perceptual field rather provides me with a unique perspective.

Merleau-Ponty proposes – in accordance with Husserl – that each perceptual experience includes a marginally given, mediating living body, operating sense organs, and a “general gestalt of bodily operating” (15, 16). My body, therefore, is the very entity through which I experience things and is able to act on them.

Albeit this resonates with the fact that I am capable of *objectifying* my body, from a phenomenological standpoint, *objectification* is not a free act but it is deriving from the experiential context where external things are provided by our own body-in-action. So objectification is quite far from being an independent act, rather it is based on a principal and underlying stance according to which our body is given to us in a way as we are actually possessing things (15). Thus the body, as a *capability* or *potential of having things*, is not limited to a certain entity or a group of entities but it “allows us to relate to all things, actual or possible, real or imaginable” (16). Or in the words of Merleau-Ponty: “my body is my general power of inhabiting all the environments which the world contains, the key to all those transpositions and equivalences which keep it constant” (15). Through his investigations concerning embodiment and intercorporeality, Merleau-Ponty demonstrated that human consciousness is not a mere product of physiology or the resultant of an abstract intellectual power. Human *perception* is always *embodied* and its corporeality is always *intentional*, furthermore its intentional character is strongly grounded in the living body’s senses. Thus his phenomenology completely dissolves Husserl’s original transcendental subjectivity in the interwoven, causative dance of mind, body, and the world. In Husserl, the body is not considered as constitutive of intentionality rather appears as a noetic performance of transcendental subjectivity. In Merleau-Ponty’s phenomenology however, the body is a primordial component of perceptual awareness and establishes a perpetual source of overall intentionality. So the intentional constitution of the living body is not a result of cognitive processes linked to any “ego” or “I”, but the body itself is the “I” in its fundamental, primitive, primeval perceptual capacity (10). As Merleau-Ponty has it, we do not *own* bodies rather we *are* bodies in its uttermost existential meaning (15).

Unlike many of the most influential figures of modern philosophy, Merleau-Ponty does not miss to take into account the body-centered perceptions and motions: Descartes, Leibniz, and Kant ignored the intricate organizing process of consciousness, rather they saw it as it passively receives impulses from the “sensory manifold” and, *in a separate step*, organizes them due to the inherent laws of Understanding (as in Kant’s philosophy). These philosophers contend that our experience of space is a result of a directly given – or *a priori* – form of Sensibility (Kant), but Merleau-Ponty showed that we actually

acquire our perception of the third dimension from our own motor activities through the lived body (18). However, probably his most important contribution to the field of consciousness research was the elucidation of the experiential domain of philosophical inquiry, which had previously given rise to the two predominant paradigms – the *metaphysical-incorporeal mind* and *material-mechanical body* – of mind-body concepts. Merleau-Ponty’s novel phenomenology wholly reconsidered these two idealistic and highly abstract models that had dominated the field of modern philosophy since Descartes and Kant. His approach to consciousness is thereby not only criticizes and loosen the ideological ossification long been present in Western philosophy, but also addresses important psychological and cognitive neuroscientific issues within the context of the philosophical discourse. As I will attempt to show in the next section, his ideas were extremely important in the elaboration of modern phenomenological terms and concepts especially as they applied to cognitive psychology and certain forms of psychotherapy.

Embodiment and psychoneuroimmunology: new vistas or old mistakes?

The term “embodiment” exemplifies a new interdisciplinary dialogue between philosophy and neuroscience (19). At the same time, contemporary discourses on embodiment have grounded a common mindset among psychologists and psychiatrists. Moreover, embodiment encompasses and integrates the newest developments in cognitive neuroscience and robotics (20, 21). Besides the scientific-technical orientation of embodied cognition, embodiment also has philosophical roots as it harnesses the key features and concepts of Husserl’s and Merleau-Ponty’s groundbreaking ideas in phenomenology. The works of *Shaun Gallagher* (22, 23) and *Thomas Fuchs* (24) demonstrate that embodiment can be seen as a new paradigm in order to reinterpret neuro-psychopathological mental states (e.g. neglect syndromes, schizophrenia, or depression) and even psychosomatic diseases. The subjectively lived body, the lived space, and lived time are all key dimensions of these approaches. It is fairly reasonable to say that the relation between body and mind, or more precisely the psychosomatic dynamics of the mind-body complex is one of the key issues in the discussions about embodiment and in the interpretation of different states of mind.

The old concept that the immune and nervous systems communicate with each other was established after a long period of continuous scientific observations, which finally gave rise to the field of psychoneuroimmunology more than three decades ago. The term *psychoneuroimmunology* (PNI) was suggested to grasp the idea of the inter-communicative nature of the brain and the immune system. This new field emerged as an integrative discipline trying to shed light on processes by which mental events modulate immune functions and how, in turn, the immune system is able to alter or interfere with the function of the mind (25). The foundation stones of modern PNI theory were laid in the middle eighties when *Besedovsky* and colleagues showed that the serum levels of certain stress hormones (glucocorticoids) are elevated in the course of immune responses to innocuous stimuli. This phenomenon seemed to influence the capacity of the immune system to respond to additional challenges, since the increase in these hormone levels during the response to an *antigen* interfered with the response to a “second unrelated” one. This observation also provided evidence for the communication between the immune and neuroendocrine systems by demonstrating that the environment of activated immune cells contained factors capable of stimulating certain parts of the brain, particularly the hypothalamus and the pituitary gland; this led to the activation of the *hypothalamic-pituitary-adrenal (HPA) axis* (26, 27). The immune-neuroendocrine-brain circuit was proposed as an important regulatory network involved in fine tuning immune responses. These early evidences showed that the immune system is able to elicit neuroendocrine responses, thus it was claimed to be a ‘*peripheral receptor organ*’ or a ‘*sixth sense*’ that transmits information to the brain about endogenous/exogenous stimuli (27, 28). Also at this time, *Blalock* and *Smith* discovered a bidirectional communication pathway between the immune and neuroendocrine systems in which immune cells can produce pituitary peptide hormones. Since neurons can also produce soluble mediators that act on immune cells it became obvious that the common use of ligands and receptors shared by the two systems may occur (29).

A decade later the rapid increase of new findings broadened the spectrum of our knowledge within the field of PNI. A decent amount of experimental and clinical evidence underscored the relevance of the brain-immune feedback mechanism during both infectious and autoimmune disorders (30, 31). As *Sternberg* argues, the central nervous system can be considered as

an integral part of the immune system by affecting immune responses (31). Contemporary psychoneuroimmunology is distinguished from its ancestors by its novel methodology and theoretical design. Early neuroimmunologists regarded the immune and nervous systems as separate parts, but a crucial conceptual leap led to the emergence of the modern approach. This new concept represents neuroimmune communication as an integrated physiological entity with the immune and nervous systems being its two *aspects* (32).

Significant neuropsychological consequences of the activation of immune system are also well-documented, such as the onset/worsening of bipolar disorder, major depression, anxiety, and schizophrenia symptoms. “*Sickness behavior*” is an important term not only in PNI but also in general psychiatry referring to the effect of inflammatory cytokines on mood and behavior. This alteration in psychological state is characterized by lethargy, social isolation, and decreased physical activity (33). The common mediators of sickness behavior involve inflammatory cytokines and several factors, which can affect the brain chemistry of mood regulators such as serotonin and other monoamines (34). Several studies point to a causal relationship between inflammatory clinical conditions, certain cytokine-based therapies and depression. Cancer and human immunodeficiency virus (HIV) patients, who receive cytokine therapy, develop cognitive and neuro-vegetative symptoms of depression (35). Well-known comorbidities with depression have been documented in cases of rheumatoid arthritis, cardiovascular disease, or myocardial infarction where the patients exhibited elevated levels of inflammatory markers (36). It is also worthwhile to note that antidepressant therapies have been reported to reduce inflammatory markers (34). The symptoms of depression caused by cytokine therapy, is also responsive to treatment with antidepressants but these have only a minor restoring effect on the balance of brain-neuroendocrine function (37). Recent research also suggests a link between innate immune processes and the etiology of schizophrenia, a psychotic disorder with extremely high prevalence. Recent studies demonstrated that antipsychotic-naïve patients with first-episode acute psychosis exhibit an inflammatory phenotype already at this early stage, and the initiation of treatment can resolve this anomaly, as reviewed by *Suvisaari* and *Mantere* (38). Being at the interface of immunology and biological psychiatry these results underscore the emerging theory of

the immune background of schizophrenia. Although many aspects of the underlying mechanisms have not been elucidated yet, several cells and factors have already been identified as potential candidates involved in the pathology of the disease. Reverse modulation of the innate immune response is also possible. Clinical studies showed that depression decreases the activity of innate, as well as adaptive immune processes. Further evidences suggest that psychosocial stress can also lead to neuroinflammation via immune cell activation. Thus, the cross-talk of the brain and the immune system in psychiatric and neurological disorders represents a multifacet feedback circuit that works rather as a single, integrated entity, than two or more synchronized systems (39).

The canalization of affective mental states (e.g. stress, depression) into bodily states always occurs within the context of the *bio-psycho-social model*. The biopsychosocial model is an approach that emphasizes the mutual importance of biological (physiological), psychological (including emotions, thoughts, behaviors), and social (cultural, socio-environmental, etc.) factors in human functioning within the context of well-being and illness. In contrast to the biomedical model, this approach states that health can be best understood and defined by the *combination* of biological, psychological, and social factors. The model was initially proposed by George L. Engel in the late '70s. Nevertheless, the PNI theory can be – should be – considered as a *naturalized psychosomatic explanatory frame*. Albeit we clearly see the psychological elements in this theory (affective factors, coping strategies coupled with certain disease-predispositions, psychosocial components, etc.), in the end, all of the routes of description and explanation collapse into *psychiatric biologism*. This is due to the fundamentally reductionist strategy that appears to be the basic attitude in the circle of researchers. Everything is reduced to molecules and biological processes, even the possible social factors are included. For instance, in this mode of examination and explanation, intimate social interactions between two lovers are reduced to mere cognitive-neurological mechanisms where body language is ultimately reduced to neurocognitive associations between the visual and prefrontal cortices. The “chemistry of love” is eventually sacrificed on the biochemical altar of pheromones and olfactory cues... This way, psychoneuroimmunology is but another reductionist-physicalist strategy with no true inventive value in the philosophy of consciousness.

From the phenomenological point of view,

however, promising and interesting elements could be lurking here. On the one hand, the immune system as a sixth sense may *indeed work as a sixth sense*. As has been shown above, the recognition of pathogenic microbes (such as viruses or bacteria) is usually leading to the secretion of inflammatory cytokines in the host. These cytokines then – as *direct signals* – are detected by brain cells, and this process is finally resulting in the modification of behavior, social cognition (sickness behavior), and so on. The immune system can detect the dangerous parts of our environment (such as infected water, food, even an infected kin) and may protect us by “subconsciously” altering our behavior. Translating it into (Husserlian) phenomenological terms, the initially *preconceptual* and *pre-reflective contents* are becoming objects of higher-level perceptual discriminations. This higher-level *mindedness* is then transforming into explicitly conceptual content through the *body*. As in Merleau-Ponty, the body (immune-brain communication via cytokines) is the medium through which environmental stimuli are becoming thought processes in a noncanonical way. Here proprioceptive and sensorimotor experience plays a secondary role as compared to the superior importance of direct cytokine signaling. Nevertheless, immune signals subsequently cause alterations in brain processes, which results in modifications of the *affective tone* or *gradedness* of the life-world. Interestingly enough, the *brain-immune axis* is the *sense organ itself* that works as an integrated unity (sixth sense) in an elaborate interaction with the environment. *Thus information derived from neuro-immune communication is becoming part of the Leib, and emerging as a constitutive component of the experiential field (e.g. literally becoming subjective experience through the various symptoms of sickness behavior)*. For example, after a viral infection has been contracted, the host's immune system recognizes the pathogen and responds with cytokine secretion, a process that is completely subliminal as far as normal perception is concerned. However, this early phase is relatively quickly leading to the above mentioned immune-brain communication in which cytokine signals are transmitted to neurons leading to the modification of behavior. Sickness behavior then not only provokes sensorimotor and nociceptive experiences (weakness, fatigue, pain, etc.) but also interferes with mood and the intentional features of social cognition (depression, avoiding behavior, etc.).

Most of the contemporary philosophical dilemmas are emerging from the so-called

“matching-content doctrine”. Reductionist researchers found very compelling isomorphisms between certain patterns of neural activities and the perception of simple geometrical shapes. However, this topographical mapping is very limited in many ways and, according to *Thompson*, we must renounce this sort of matching-content approach (41). Albeit isomorphisms might be useful in cases of very simple visual patterns in cognitive sciences, some researchers try to expand their importance to higher-level conscious events, as well. For instance, *Antonio Damasio* defines a certain class of “dispositional representations” that emerge on higher levels of informational processing and fundamentally determine the boundary conditions of sensation and feeling (42). Nevertheless, as *Thompson* has it, we must realize that we *are unable to reduce the wholeness of the phenomenal field to brain activity* (41). He contends that, at least on an abstract level, dynamic systems theory could be the common axis that could complementarily model brain processes and the eidetic features of phenomenal experiences (41). He also emphasizes that we can no longer find the phenomenological analogy of life-world below the level of self-organizing autopoietic systems (*ibid.*, p. 159). In line with this, several other philosophers and investigators point out explicitly that the neurophenomenological concept of consciousness could boost and extend the discourse on transdisciplinary psycho-neuro-research (21, 43–45). *Varela* and *Thompson*, in a certain sense, accept the non-eliminable nature of the explanatory gap, and the irreducibility of the lived body and transcendental ego. On the path of classic phenomenology they do not consider consciousness as an *attribute-to-be-reduced* rather as an *emergent feature of the bodily-intersubjective mode of existence*, a zero-point of orientation that gives rise to the unfolding of the experiential aspect of existence (19, 46). Psychoneuroimmunology recently emerged as a field in life sciences that may give an important piece to the big picture of interdisciplinary consciousness research.

The naturalized phenomenological explanatory frame may provide an excellent way to philosophically analyze psychosomatic processes in a detailed fashion. Similarly to *Merleau-Ponty*, *Husserl* also believed that positive sciences reveal matters that transcendental phenomenology has to take into consideration. *Husserl*’s heightened interest in the transcendental significance of intersubjectivity and embodiment made him to enter the fields of other disciplines, such as psychopathology, sociology, or anthropology (40). A sharp separation between the *empirical* and the *transcendental*, within the context of both *Husserl*’s and *Merleau-Ponty*’s phenomenology, is “both inadequate and partially misleading” if this opposition is considered as a conclusive and definitive argument against the naturalization of phenomenology (40). The increasing importance of empirical science in phenomenological research is also very prominent in *Merleau-Ponty*’s late works. Pathologies of the body and mind – as deviations from normality – give us an ample amount of “raw material” to look into domains of the *anthrôpos*, the human phenomenon, which have been hidden before. *Merleau-Ponty* himself widely used various psycho- and neuropathological examples in explaining and supporting his theses in phenomenology; he also points out to the significance of scientific approach to clarify the fundamental characteristics of diseases. His methodology promotes a “merged” philosophical stance far beyond the discrimination of the objective scientific explanation and the subjective phenomenological reflection. What is more, *Merleau-Ponty* envisioned that phenomenology could be changed and modified through the interdisciplinary dialogue with empirical sciences. Importantly, his position neither discards the transcendental nor reduces phenomenology to another positive science. Thus naturalizing phenomenology may lead to a fruitful de facto interdisciplinary dialogue between life sciences and philosophy by creating a melting pot of ideas that may give rise to novel approaches in medical sciences.

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