A Mildly Naturalized Husserlian Framework for Embodied Cognitive Science

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ABSTRACT

Embodied cognitive science can enter into a fruitful dialogue with Husserl's phenomenology on condition that both partners collaborate on an equal footing. Neither phenomenology needs to renounce to its transcendental vocation nor embodied cognitive science must adopt a too strong naturalistic stance in favour of a weakened form of phenomenology, namely phenomenological psychology as the unique viable way of practicing phenomenology in a scientifically acceptable manner. Instead, in the context of a mild or liberal naturalism, based on the recognition of the existence of multiple ontological levels of reality, phenomenological psychology can act as a buffer zone between sciences of mind and transcendental phenomenology. The former should renounce to both the requirement of a linear continuity from natural science to phenomenology, and to the commitment to the physicalist principle of causal closure. The latter should abandon its dogmatic pretention to infallibility as well as its emphasis on consciousness as a self-enclosed domain of being. Husserl's conception of lived body can serve as an example for a mutual collaboration between phenomenology and embodied cognitive science to the extent that it belongs to transcendental subjectivity, since it contributes to the constitution of a world-environment for the cognitive agent, and at the same time can act as a proper theoretical framework for the sensorimotor account.

Introduction

In this contribution I aim at developing some critical considerations about a possible dialogue between Husserlian phenomenology and embodied cognitive science to which both partners can participate with equal dignity, apart from any concession to radical forms of naturalism. This involves that phenomenology

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and cognitive science should address the task of investigating human experience each exploiting its own methodological resources and pursuing its disciplinary aims, since the former takes experience into account primarily as regards the structural features of its conscious first-personal appearance, whereas the latter explores its hidden causal underpinnings. Phenomenology and cognitive science are different theoretical enterprises, each of which relies autonomously on its own methods and categorial apparatus. This does not prevent that both disciplines collaborate and influence each other by exerting some kind of constraints for the benefit of a fruitful division of labour. Phenomenology alone cannot provide full explanations of our conscious experiences as regards their subpersonal substrate and needs therefore to be integrated in a unitary framework which allows for its communication with the empirical sciences of mind, without any need to distort phenomenology's transcendental features. On the other side, cognitive science should seriously take into account phenomenological and eidetic descriptions of first-person experience and avoid superimposing on it its own ontological and methodological assumptions.

In the first part of the paper, I try to highlight how Husserl's phenomenology amounts to a theory of experience which keeps itself equidistant from both extremes of scientism and idealism and to illustrate the necessity of deflating Husserl's transcendental philosophy through a critical assessment on its attitude toward natural sciences. I will focus at the same time on its right to conduct its inquiries in a relatively autonomous fashion, with due regard to empirical evidence. In connection with this issue, the second part of the paper explores the mediating role of phenomenological psychology in allowing a mutual exchange between transcendental phenomenology and the (mild) naturalistic stance endorsed by embodied cognitive sciences, given its bivalent status as a naturalistic science of mind (at least in Husserl's sense of the term) which is at same time respectful of both the transcendental function of conscious experience in disclosing the world and its structural eidetic features. The third part proceeds to a critical evaluation of how the encounter between phenomenology and embodied cognitive sciences could take place by underlining some ontological and methodological shortcomings in which some of the representatives of the latter incur. In the fourth part, I argue for a mild naturalization of phenomenology by confronting it with some forms of non-reductionist naturalism (e.g. liberal and enactive naturalism) for the purpose of safeguarding its fundamental descriptive, explanatory and methodological tenets. In the fifth and final part I discuss the topic of lived body and embodiment as an example for a common field

of inquiry for phenomenological and empirical research, as far as lived body represents the turning point which allows for the mutual transition from the transcendental level of phenomenological investigation to the empirical one of causal explanation cashed out in terms of a mildly naturalized embodied cognitive science. To this aim, I try to focus on the intrinsic belongingness of lived body to the essential features of transcendental subjectivity to the extent that it plays a major role in disclosing an oriented worldly space through its kinaesthetic powers, shaped in terms of possibilities of action. Whereas transcendental phenomenology highlights the role of bodily motion in constituting such a world, cognitive science can provide a formalized framework of the coupling relations between kinaesthesias and perceptual adumbrations as its empirical counterpart in terms of sensory-motor contingencies.

1. Deflating Husserl's transcendentalism for its own sake?

I will begin to discuss the problematic relation between natural sciences of mind and phenomenology by pointing out that consciousness and subjectivity are not to be reified in terms of "emerging" or whatsoever "supervening" entities that are built on neurophysiological or computational states. Husserl's phenomenology does not subscribe any form of commitment to such ontological worries, although it can be made compatible with some of these accounts, without that both its descriptive value and transcendental relevance are undermined. Put differently, conscious experiences can be described in their own terms, no matter if they are supposed to emerge or superevene on the organism's self-organizing processes or not. The only requirement to be met is to recognize consciousness as a primitive and original phenomenon in its own rights, in whatever way it can be scientifically explained, given that no scientific approach can wholly exhaust *every feature* of conscious experience by reframing it in the sense of a kind of punctual correspondence between the conscious level and the neurological one. To this regard, it is mandatory to distinguish between consciousness as empirical object of investigation and consciousness in its transcendental and disclosing function, namely as a condition for accessing a world of things to which it is intentionally related and for the very presence of objects to an embodied cognitive agent.

For phenomenologists, consciousness is not only and not primarily a natural worldly thing, but the first and fundamental way of experiencing reality

as it is constituted for a conscious agent. Hence the essential link between consciousness and intentionality: every intentional act is consciousness of something other than itself and the experiencing subject, and involves her being affected from this alterity. Investigating conscious experience equates to elucidating its invariant structures in their essential and normative value, far from introspecting the supposed arbitrary and chaotic course of mental events in someone's head. Phenomenology is neither a form of sophisticated introspection nor an analysis of the qualitative features of consciousness, but a disciplined and reflective way of describing our conscious access to the world. Phenomenology takes as its starting point human experience as it spontaneously arises for an embodied cognitive agent embedded in her own environment and in the common world she shares with others. Husserl himself has always stressed along his entire work the mutual relationship between conscious mind, body and world and has drawn up a comprehensive and consequent theory of experience which refutes both the opposite views of scientistic objectivism and idealism.

As regards this last point, some clarity is required. Indeed, the emphasis Husserl repeatedly places on consciousness as an absolute realm of being, independent from every worldly reality, suggests his commitment with a form of transcendental idealism. However, Husserl does not radicalize this position so far as to delegate to a self-transparent and omniscient subject the task of deducing reality from itself. Husserl does recognize the evident fact that we constantly confront ourselves with a world that is largely alien to us and resists our efforts of coping with it. Hence the need of fostering a deflactionary reading of Husserl's transcendental phenomenology, in order to promote a fruitful encounter with cognitive science. In a much-quoted passage Husserl defines consciousness as a self-enclosed ontological realm:

> "consciousness considered in its 'purity' must be held to be a self-contained complex of being, a complex of absolute being into which nothing can penetrate and out of which nothing can slip, to which nothing is spatiotemporally external and which cannot be within any spatiotemporal complex, which cannot be affected by any physical thing and cannot exercise causation upon any physical thing – it being presupposed that causality has the normal sense of causality pertaining to Nature as a relationship of dependence between realities" (Husserl, 1982b: 112).

Likewise, Husserl's faith in reliability of the absolute and infallible evidence of our conscious acts as the «legitimizing source of cognition» (Husserl 1982b: 44) should be restrained. Husserl himself did not fail to point out that inner

intuition is limited in its scope to the basic sense of mineness which accompanies the conscious acts one is living through here and now, and in most respects is prone to deceptions. Put otherwise, the intuitive and immediate way of givenness of our experiences cannot act as an unshakable foundation to build on it an incontrovertible knowledge which should resist any doubt. Truth as apodicticity is an ideal that can never be attained, and phenomenological descriptions can at any time called into question as long as they are exposed to refutations and rectifications. This qualifies phenomenology as an open-ended and intersubjective enterprise which steadily requires internal and external justification. On the one side, transcendental phenomenology too is fallible in its statements, on the other it cannot ground rigorous knowledge on its theoretical tools alone and needs to be confronted with the empirical results of natural science and competing theoretical accounts.

Although Husserl has condemned naturalism in its most extreme forms as in positivism and in scientism, he was always respectful toward (natural) science. Indeed, as is well known, he was given an interdisciplinary education in physics, mathematics, and psychology. His mentors and friends include the mathematicians K. Weierstrass, L. Kronecker and D. Hilbert as well as philosophers and psychologists such as W. Wundt, F. Brentano and C. Stumpf.[1] Stumpf and Brentano have awakened Husserl's interest in experimental psychology which has represented for him a long-lasting theme of critical confrontation. Still until the end of his philosophical career, Husserl does insist on the "indissoluble inner alliance [...] between psychology and transcendental philosophy".[2] Hence, already in its original configuration phenomenology is open to science and other philosophical traditions, as well as contaminated by everything coming from our life-world as constituted and experienced in our everyday attitude. The claim to absolute evidence made by phenomenological and eidetic intuition needs to be downsized, given that consciousness and cognition are subject to the influence of various cultural and social factors, such as the newest information technologies and the achievements of science. Phenomenological reduction cannot take place once and for all and seclude everything pertaining

[1] Examples of the influences of psychology on phenomenological theories include W. James' concept of fringe, which Husserl reappraises in his own notion of horizon (Moran, 2018), Stumpf's concept of fusion (Fisette, 2009) and Ehrenfehls' and Mach's concept of *Gestalt* (Ierna, 2005), which lead Husserl to his original account of conscious experiences as indecomposable wholes rather than as aggregates of discrete elements.

[2] Husserl, 1970: 206.

to the domain of a supposedly pure consciousness from a confrontation with the world of natural attitude. Phenomenology is no repertory of timeless and dogmatic truths about what consciousness is in its essence, but a virtually endless investigation of conscious experiences in their dynamic transformations (Reynolds 2017; Pokropski 2022).

Husserl's transcendental phenomenology can provide an epistemological and ontological-regional framework for those disciplines that, like the cognitive sciences, investigate the structures of experience which act as conditions of possibility for its emergence and for the constitution of objectivities. Whereas psychology and neurosciences try to explain mental states as natural processes by identifying their underlying causes, phenomenology describes the essential features of our conscious experiences as they are lived through by a subject, with particular attention to the a priori constraints these features exert to their actual course. Phenomenological descriptions have irreplaceable value insofar as they help to clarify in a rigorous manner the structures of our lived experiences for the purpose of developing experimental hypotheses,[3] but they are not sufficient to explain the sub-personal factors underpinning them. Hence the necessity of integrating phenomenology with empirical sciences of mind with a view to mutual collaboration.

Instead of offering complete explanations, phenomenology can help to better understand the constitutive structures which inform our conscious experiences. Phenomenology fulfils this purpose not only through careful descriptions but rather by revealing the invariant features all experiences exhibit through the method of eidetic variations. Phenomenological eidetics has explicative relevance insofar as these features act also as lawful regularities which lead and motivate the actual course of our conscious experiences. However, since they are limited to the first-personal level of our experiences and are of little pre-

[3] Besides of neurophenomenology (see below: 42), which exploits phenomenological description for the purpose of training experimental subjects, other examples of such attempts are front-loaded phenomenology (Gallagher & Brøsted Sørensen, 2006) and microphenomenology (Petitmengin 2006). The former draws on phenomenological insights already in experimental design and contributes to give them empirical validation, whereas the latter consists in a phenomenologically informed interview technique, which should allow experimental subjects to produce well-refined reports about their experiences, apart from every prejudice about them.

dictive value, such explanations need to be supplemented by empirical investigations carried out at a sub-personal level in order to highlight the causal factors which actually give rise to our experiences[4].

At least for some authors (De Preester 2002; Moran 2013), establishing a partnership between phenomenology and empirical sciences of mind implies a too demanding theoretical move, namely the naturalization of phenomenology, and therefore dismissing the transcendental attitude. Phenomenology should resist every attempt at naturalizing it because of its inherent commitment to transcendentalism and its qualification as an investigation concerning mainly the conditions of possibility for every worldly reality to be constituted. As belonging to a subject that taken in itself is not integral part of a real world, these conditions cannot be objectified and scientifically processed. Indeed, the scope of empirical sciences of mind is limited to the mental states regarded as objective and real events, occurring in a spatio-temporal world and causally determined. On the contrary, phenomenology is not primarily interested in the real psychophysical subject, but in the transcendental one, whose essential features are disclosed through phenomenological reduction. The transcendental subject does not belong to the world like any other being, because it acts as the very condition of possibility for every being to appear. So, phenomenology qualifies as an inquiry about the manifold ways transcendental consciousness constitutes every object, including those covered by empirical sciences. Hence, any attempt to couple phenomenology and cognitive sciences is doomed to failure, because phenomenology is much more than a careful description of our experiences just as they exist factually, domesticated for the purposes of empirical research. Naturalizing the transcendental subject equates to reduce it to the real one and to lose sight of its essential features.

As a matter of fact, such a theoretical posture is committed to ontological claims insofar as it postulates a continuity between physical and phenomenological data and treats consciousness as a natural being, whose features can be exhaustively explained through empirical science. However, an insurmountable obstacle stands in the way of this project. As already pointed out, consciousness cannot be fully equated to an object available to empirical investigation, since in its transcendental function it has the value of condition of possibility for every experience to occur and for every phenomenon to appear. On the other

[4] For the necessity of integrating phenomenology with the natural sciences of mind and its insufficiency in delivering complete explanations see Gallagher, 2022 and Pokropski, 2022.

side, this should not lead to the opposite extreme of making consciousness an absolute and self-enclosed region of being, as Husserl does in the first volume of his *Ideas*, whereas any other reality would only have relative value. If consciousness is neither a factual object nor a privileged, ideal form of being, there is nothing left but to conceive it together with the transcendental ego as an invariant structure (Ramstead, 2015) or even better as a normative function that applies without exception.

Transcendental phenomenology performs its tasks within its own domain and qualifies as a theoretical enterprise in its distinction from empirical sciences both in its methods and epistemological assumptions (Gallagher, 2022; Pokropski, 2022). As such, transcendental phenomenology cannot be made rigidly continuous with sciences without losing its constitutive features and fully deserves the status of an autonomous discipline, because of its insistence on subjectivity as the condition of possibility for every experience. The rigorous descriptions of conscious experience provided by transcendental phenomenology also aim at scientific accuracy, although not in the same terms as experimental research and apart from any metaphysical commitment. Transcendental phenomenology relies on its own specific methods of inquiry – phenomenological reduction, eidetic intuition, free variation – but shares with natural sciences the ideal of exactness as well as the striving for law-like generalities which inform the structures of consciousness and lead its processes (Reynolds, 2017).

2. The shifting from transcendental phenomenology to phenomenological psychology

Although it cannot for itself be subject to a naturalization strategy, transcendental phenomenology too can enter a productive dialogue with psychology and cognitive sciences, as far as it addresses questions pertaining our way of accessing and constituting a world of experience, both as nature and in its human meaning[5]. The scope of phenomenology is not confined to carefully describe the structures of consciousness, since it can shed light on the manifold ways our experience shapes both the objects we encounter in our everyday experience and those we discover through more sophisticated scientific practices. To allow such

[5] The constitutive resistance of transcendental phenomenology to every attempt of naturalisation, as well as its distinction from phenomenological psychology, is represented in a quite non ambiguous way by D. Zahavi (2004; 2010; 2013; 2017).

an exchange, a shifting from transcendental phenomenology to phenomenological psychology is required (Reynolds, 2017; Gallagher, 2022; Pokropski, 2022). Husserl himself has recognized in phenomenological psychology the empirical counterpart of transcendental phenomenology, as far as it aims at investigating conscious experiences in their factual objectivity within the natural attitude, without, however, granting anything to both methodological and ontological reductionism. Husserl characterizes phenomenological psychology as an eidetic and descriptive discipline, grounded on the material a priori "Animal nature" (Mind and Lived body) whose task consists in elucidating the generic and essential features shared by all the individuals belonging to this ontological region. In the contemporary debate, phenomenological psychology can be defined either as the application of phenomenological methods in experimental psychology or, in a more traditional fashion, as a philosophical reflection about the structural features of our experience and life-world which has to be conducted within the boundaries of natural attitude.

Given that phenomenological psychology falls within the natural attitude like the empirical sciences of mind, it can be considered together with them a constitutive science to the extent that they can contribute to explain how natural mental processes act as conditions of possibility for experiences as they factually are. The interchange between transcendental phenomenology and empirical sciences of mind is motivated, firstly, by the need to justify how transcendence constitutes in immanence and, secondly, by the relevance of a careful phenomenological elucidation of the material eidetic structures which inform the ontological region "Animal nature". In this regard, it is worth highlighting that transcendental phenomenology cannot accomplish this endeavour alone by relying solely on its own theoretical tools, since they are addressed to eidetic issues. Reconstructing the genesis of our cognitive and subjective-transcendental structures necessarily requires the contribution of empirical sciences of mind. It must also be taken into account that every change in the empirical conditions of our sensory and perceptual experience may affect even dramatically the transcendental structures that constitute our access to the world, provided that this does not imply the total absorption of the level of transcendental inquiry into that of experimental research.

By virtue of its medial position between transcendental phenomenology and empirical psychology, phenomenological psychology can act as a buffer zone by enabling a conceptual translation from one domain to the other as well as a more focused consideration of the phenomena to be explained. Moreover,

the change from the transcendental attitude to the naturalist one entailed by such a shifting ensures a twofold advantage. Firstly, the methods employed in phenomenological-transcendental investigations acquire operational relevance since they are confronted with experimental standards. Secondly, the theoretical entities covered by transcendental phenomenology such as "adumbrations", "immanent time", "lived body" and the like gain scientific tractability to the extent that they can be measured or formalized. Neither transcendental phenomenology nor empirical research remain unaffected by their exchange. Genuine transcendental inquiry in Husserl's sense has to be conducted without settling for a misconception of phenomenology as a repertoire of dogmatic axioms on what consciousness should be and trusting intuitive evidence as an infallible source of knowledge. As previously noted, transcendental investigations too are not immune from failures and, at least to a certain extent, can be amended or refined by evidence coming from empirical science.

In sum, transcendental phenomenology has to be understood not as a self-enclosed realm completely detached from the empirical sciences of mind, but as a relatively autonomous theoretical enterprise that can enter into dialogue with them on an equal footing, without necessarily assuming a deferential attitude[6]. The naturalization of phenomenology applies only to its empirical counterpart, namely phenomenological psychology, leaving transcendental phenomenology unaffected, as far as the former lies entirely within the limits of natural attitude. Whereas phenomenological psychology considers conscious experiences together with their bearers as constituted objects belonging to the ontological region Nature, transcendental phenomenology highlights the role of consciousness as condition of possibility for accessing the world and bestowing it with meaning. However, as Netland (2020: 6) rightly remarks, the mere addition of a phenomenological psychology to the list of natural sciences of mind seems not to satisfactorily answer the question of the relationship that should be established between transcendental phenomenology and empirical sciences. To this objection it can be replied that phenomenological psychology can act as a mediating term since it is integral part of transcendental phenomenology, given its eidetic character, and at the same time qualifies as an empirical science in its own right.

As L. Albertazzi (2018; 2021a; 2021b) points out, phenomenology is not only a descriptive endeavour, since its psychological counterpart is endowed

[6] Both Reynolds (2017: 20-21) and Zahavi (2017: 162-163) emphasize this exigency.

with explanatory powers, as far as it manipulates in a systematic and disciplined fashion the observed perceptual phenomena "by discovering the structural conditions of their appearing in consciousness" (Albertazzi 2021b: 2198). As the work of many Gestalt and phenomenology-inspired psychologists like Koffka, Metzger, Michotte, Kanisza and others has demonstrated[7], perceptual illusions occur only under certain constraints which act as "conditions of existence" for their appearing. Such conditions are neither to be equated to physical causes nor play any role as physical events in explaining the relations obtaining in a phenomenal array. Perceptual appearances must be investigated in both their structural and phenomenal features, instead of mistaking them for physical stimuli. Contrary to what Casper & Haueis (2022) claim, phenomenological explanations *do meet* the requirement of causal asymmetry since they avoid the threat of circularity between the explanans and the explanandum. Consider for instance the Kanisza triangle illusion: perceiving the shape of a white triangle emerging on the background of three black disks with a sector removed and the truncated vertices of another inverted triangle is an effect which depends on the overall space arrangement. If you change the position of only one disk the illusion does not arise. Hence, it is the whole structural configuration what explains the amodal perception of the white triangle and not the other way round.

Recently, M. Stendera (2022) has provided good arguments for the claim that phenomenology has genuine explanatory powers rather than merely providing refined descriptions of the phenomena to be properly explained only by natural science. She moves from Wheeler's (2013) reappraisal of McDowell's (1994) distinction between constitutive and enabling explanations to suggest a virtuous division of labour between phenomenology and cognitive science. Whereas the former aim at highlighting the structural conditions that distinguish a phenomenon in its genuine way of being, the latter search for the causal factors hidden behind them at a sub-personal level. Moreover, phenome-

[7] As a matter of fact, several exchanges have taken place between Husserl and the main representatives of the Berlin school of psychology. Wertheimer and Koffka were familiar with Husserl's *Logical Investigations* even before publishing their earliest papers (Ash, 1995: 108; Harrison, 2016) and Koffka himself has quoted Husserl's critique of psychologism in his *Principle of Psychology*. Feest (2019) has recently shown how Gestalt psychology shares some theoretical motives with Husserl's phenomenology, such as the critique of naturalism and introspection, and performs a kind of front-loading phenomenology, since phenomenological analyses are already engrained in experimental design.

nology deals with a peculiar kind of causality, namely motivation, which concerns not the objective causal chain of natural events which allow for a conscious experience to occur but the network of meanings and norms which intrinsically orient the behaviour of a cognitive agent – understood in enactivist terms as a self-maintaining system – in view of the pursuit of its aims and interests.

As an explanatory-descriptive account of the essential features of our conscious experiences, phenomenological psychology can work alongside the other sciences of mind but must not be conflated with them, since it uses methodological tools appropriate to its object and can be naturalized to the extent that subjective experiences are measured by resorting to suitable procedures. For example, some features of sensations like intensity can be formalized through mathematical tools which apply only to the phenomenal appearances, apart from any pretension to correlate them to brain processes according to a naive isomorphism. It is one thing to ascertain metric relations in an isotropic geometric space – say, the distance between two assemblies of neurons in brain –, it is quite another to define proximity in a perspectivally perceived one. Conscious experiences are at least in part materially constituted by brain processes, but this does not mean that the former *represent* the latter as their imperfect image. To sum up, naturalizing phenomenology means nothing more than applying to its domain rigorous methods of description, explanation and measurement, far from bridging an alleged gap between it and brain sciences.

3. Phenomenology meets embodied cognitive science

On the wake of the seminal work of Varela, Thompson and Rosch (Varela et al. 1992), many philosophers of mind and cognition have proposed during the last three decades to integrate phenomenology – or, better said, its naturalized version – in a new paradigm in cognitive science that should replace or at least amend the mainstream view, based on 1stgeneration AI and neuroscience. The central argument moved against classical cognitive science insists on its inadequacy to explain cognition in terms of sub-personal, symbolic, amodal and skull-bounded representations which are manipulated according to syntactic rules along flowcharts. This is all is needed to reconstruct the hidden processes that lie at the bottom of our mental life and to explain within a unitary framework its essential features. Moreover, the order of magnitude with which AI works – sub-personal representations instead of conscious experiences – is by far the more

amenable to being formalised in mathematical terms and allows for a coherent physicalist view of mind.

As S. Gallagher (2022: 24-25) remarks, an irreconcilable opposition exists between phenomenology and classical cognitive science. According to some proponents of the latter, such as Kosslyn, Pylyshyn and Dennett, phenomenology cannot offer any essential contribution to scientific explanation. Representations are unconscious and originate from information processing processes that take place at the sub-personal level. Contrary to this view, Gallagher highlights the merits of phenomenology as far as it provides detailed and systematic descriptions of the features of our conscious experiences by far more sophisticated and refined than the impoverished version of empiricist psychology shared by most cognitive scientists, as well as a fine-grained categorical apparatus.

Indeed, mainstream cognitive science relies on methodological and ontological assumptions strongly indebted with an outdated conception of physics dating back to 17th century, since it uncritically takes up its mechanicism and reduces conscious experiences with their rich phenomenal content to the by-product of neuronal processes. Brain architecture and activity are equated to a formal representation of a "true" world defined in physicalist terms as constituted by material particles encoded as bits of information. Mental states too are decomposable in small elementary symbolic units once this kind of homology between mind and world has established as well as their principal separateness. Hence the problem of explaining how self-enclosed mental representations can intentionally refer to the world, if the possibility of being directly acquainted with it is denied from the outset.

Here I am arguing against a representationalist view, as far as it is concerned solely with sub-personal processes, according to which in our brain is implemented a set of not conscious and (sub)symbolic representation that encode external information understood in physical-mathematic terms. This account is incompatible with phenomenology as an enquiry about our conscious experience and its ways of structuring as well as with the 4E approaches based on it. My main concern is that such a hypothesis about hidden, sub-personal representations and processes cannot do justice to the *explicandum*, namely our experience as embodied beings, contextually situated in an environment populated by medium-size objects, which is directly accessed before of being represented. It is as if the microphysical level of the interaction between discrete packets of information and our sensorial receptors collapses with the ecological,

mesoscopic one, defined by the dynamic, covarying couplings of organism (brain plus body) and environment. Such an approach is strongly indebted with the old empirical account of perception as constituted by parcelled raw sensory data, in which the whole perceptual array of our world would at the end dissolve. I therefore deem necessary to keep rigorously distinct an ecological view and a physicalist one according to their respective areas of application.

Given the oversimplified hypothesis that our whole mental life can be translated in symbols and in mechanical operations governed by algorithms, it is questionable whether conscious experiences can be modelled in such a way without losing what constitutes them in their essence, namely their meaning, qualitative richness, expressiveness, ecological saliency and the like. The whole debate about "qualia" – the magical word that should act as universal passkey for bunching up all these disparate phenomena under the same category – is flawed from the very start by the fatal misunderstanding of having downgraded subjectivity to an epiphenomenal residuum which should be explained away or, at best, relegated to the role of harmless embellishment.

Albertazzi (2021a) rightly points out that the unquestioned adoption of both the information theory of Shannon and Weaver and the computational paradigm by the cognitive sciences had long-lasting consequences in research on perception. Cognitive agents do more than just decode informational stimuli in the environment, since information is from the very beginning endowed with an intrinsic meaning and semantic properties irreducible to a language of thought. Objects have a meaning to the extent that they are qualitatively salient for the current situation of an embodied and embedded agent "in present awareness" and not judged as such because of unconscious inferences or learning from past experience. Present experience as a whole does precede physical stimuli and is immediately bound with its intentional correlates, instead of representing them through the intermediation of meaningless informational cues. In other words, every conscious experience is an irreducible Gestalt which cannot be generated in a bottom-up fashion by the combination of informational atoms.

On the opposite side, supporters of embodied cognitive science[8] argue that there is no sharp divide between cognitive agents and world and that cognition is not confined to what happens into their brains. Cognitive agents are indeed essentially and not only contingently embodied, contrary to the theoretical

[8] As for the wide literature on phenomenology-inspired cognitive science see above all Chemero, 2011; Chemero & Käufer, 2021; Clark, 1997; Di Paolo et al., 2017, Gallagher, 2017; Hutto & Myin, 2013; Noë, 2004, 2009; Rowlands, 2010.

tenet of multirealisability, according to which the material structure where mind is implemented is indifferent to its formal architecture. Second, they enact their own world by exploiting practical skills that do not require neither conscious nor sub-personal representations. Third, they are embedded in this world to the extent that their actions and mental states acquire meaning only within its context. Fourth, they can extend their capabilities through tools and instruments that become integral part of their bodies.

These theoretical assumptions are foreshadowed in Husserl's phenomenology, which can furnish an adequate set of concepts viable enough not only to the aim of underpinning them, but also for the purpose of tempering the excesses of the anti-representationalism shared by many of their supporters. It is no coincidence that especially anti-representationalists prefer to draw inspiration from Merleau-Ponty, which has tried to blur the boundaries between subject and world by both enhancing their mutual and immediate inherence and abolishing every distinction between subject and object, representation and reality, mind and world. On the contrary, Husserl maintains a clear-cut distinction between consciousness and world, although he stresses their reciprocal belongingness.

In its original and "orthodox" formulation (Roy et al., 1999: 19, 44-48), the project of naturalizing phenomenology should not be limited to a correlation between the neurobiological and the phenomenological level but must provide an explanation of neutralized "phenomenological data" understood as properties of brain and body. Such an attempt presupposes the preliminary task of providing a unitary framework which assures the full integration of the biological domain (and the causal order of nature) and the phenomenological one. This implies a drastic recategorization of Husserl′s ontological model, which emphasizes both irreducibility and autonomy of the manifold regions of being it comprises.

Both domains of phenomenological mind and neurobiological processes can be led back to a common level of abstraction to assure their fluid and effortless communication. To this aim, Roy et al. (1999) propose to formalize phenomenological descriptions by resorting to the mathematical tools of the dynamical systems theory. One can bridge the gap between consciousness and brain through models which can apply both to third-person neurological processes and first-person lived experiences thanks their neutrality, by assuming that the processes occurring in both domains obey to the same dynamical prin-

ciples. It is a fact that Husserl denies phenomenology the rank of formal discipline, since it proceeds not axiomatically but descriptively, and it is concerned with vague essences instead of exact ones. However, as Pokropski (2022: 50–51) remarks, this does not prevent him to adopt quasi-mathematical models of description as for instance in his analyses on the relation of conditionality between kinaesthesias and presenting sensations or on the constitution of an oriented environmental space expounded in *Thing and space,* which are closely reminiscent of the models employed in dynamical systems theory[9].

The most widespread and famous attempt at naturalizing phenomenology is Varela's (1996) proposal of embodied cognitive science, epitomized under the label "neurophenomenology". Neurophenomenology tries to combine phenomenological methods and analysis with empirical research in neuroscience so that both disciplines can exert on each other "reciprocal constraints". Phenomenology provides descriptions that help neuroscience to focus more accurately the phenomena it must explain while neuroscientific results reshape our basic phenomenological intuitions. This approach consists of three steps: 1) phenomenology detects the invariant features of conscious experiences; 2) theory of dynamical systems provides formal models of these invariant features; 3) as well as of the corresponding large-scale brain processes. The main idea is that both brain events and conscious experiences are dynamical systems whose behaviour cannot be explained in terms of bare mechanical interactions between discrete components. The parts of a dynamical system interact in a non-linear way giving rise to a process of self-organization in which the parts dynamically codetermine each other through time.

Varela's proposal falls short of filling the gap between brain and consciousness, since it merely identifies a correlation between quantitative neuronal processes and qualitative experiences without giving a satisfactory explanation of the latter. To demand this is tantamount to commit a categorial mistake. The events occurring in the domain of (perceptual) experience are to be explained according to laws and rules that specifically apply to it and not to those of physics and neurobiology (Albertazzi, 2018). This kind of intertheoretic reduction runs into such error as far as the entities considered by sciences as molecular neurobiology cannot explain meaningful behaviour and conscious experiences: psychology and phenomenology, not neurosciences provide the proper

[9] I will dwell on this topic here, sect. 5.

explanatory framework for these facts, since they involve consciousness, subjectivity, and first-person perspective (Gallagher, 2018). Beside of this, as D.W. Smith (1999) remarks, such an attempt is at odds with a fundamental trait of Husserl's ontological framework, namely pluralism. Despite of their diversity, Husserl's regional ontologies refer all together to the same world and are not to be understood as separate layers, since each of them descends from a peculiar constitutive stance which is not arbitrary but depends upon the concrete capacities of cognition and action with which every subject is endowed. Put differently, ontologies do not mirror an already given reality, encoded in a physicalist format, but suppose the essential structures of transcendental subjectivity as well as its constituting powers which offer insurmountable resistance to any naturalization strategy understood in a strong sense.

From a methodological point of view, insisting on the relationship of mutual constraints or continuity between phenomenology and cognitive science should not entail that phenomenology has to be reduced to a mere auxiliary descriptive tool whose role is limited to serve experimental research. Empirical evidence exerts some pressure on phenomenological ones, but not to the extent that the conceptual-descriptive framework of phenomenology is radically challenged. For example, recent neuroscientific experiments have contributed to a sharper refinement of the phenomenological distinction between bodily ownership and bodily agency, which are usually blurred each with other in our everyday experience, by individuating the brain processes responsible for them[10]. Going a bit further back in time, both concepts of Gestalt and of field of consciousness have become part and parcel of phenomenological tradition even thanks Husserl's acquaintance with psychological research of his days[11] and A. Gurwitsch's more assiduous confrontation with Gestalt psychology. For its part, phenomenology does not merely provide refined clarifications of the *explananda* but establishes some constraints for empirical research. On the one side, phenomenology insists on the necessity of avoiding counter-intuitive and arbitrary explanations that would misrepresent the phenomena under investigation and are chosen for the sake of abstract methodological requirements such as explanatory simplicity and economy. Add to this the fideistic appeal shared by many scientists to future advances in research that should justify this approach. On the other side, phenomenology limits the scope of investigation to the mechanisms

[10] See Gallagher, 2010: 27.
[11] See here, n. 1.

that are the actual cause of our experiences without postulating any naive isomorphism between the sub-personal level and the conscious one.

4. Gentle naturalism, not ruthless!

These considerations bring us to the question of what form of naturalism should be adopted for the purpose of establishing a genuine cooperative partnership between phenomenology and cognitive science. According to many authors (e.g. Ramstead, 2015; Reynolds, 2017), the only way to make naturalism compatible with transcendental phenomenology is to adopt a weak form of methodological naturalism. The principle of continuity between phenomenology and natural sciences applies only to the entities fully eligible for naturalization, namely conscious experiences and mental states insofar as they can be investigated through the tools of experimental science and the neurophysiological processes underlying them, but not values, norms, work of art, artifacts, cultural and social objects and the like. This exclusion also holds, of course, for transcendental consciousness in its disclosing and constitutive function.

As pointed out by Ramstead (2015), weak naturalism applies only to phenomenological psychology and not to transcendental phenomenology. Nevertheless, the latter does not remain untouched by the exchange between the former and the empirical sciences of mind, given that transcendental phenomenology and phenomenological psychology are closely interwoven. Put differently, the "mutual enlightenment" (Gallagher 1997) between transcendental phenomenology and cognitive science can bring also to a redefinition of the tasks and development of the former. On the other hand, cognitive sciences should at least soften their naturalistic stance and take conscious phenomena seriously in their genuine way of appearing and in their constituting function. In this sense, Reynolds (2017: 20-21) advocates a "minimal phenomenology" which envisages for it the possibility to be made compatible with weak or liberal forms of naturalism[12], if it can cooperate with empirical sciences on an equal footing for the purpose of a mutual interchange. Both phenomenology and cog-

[12] Reynolds maintains that such a move is possible only by dismissing Husserl's intransigent attitude to transcendentalism and by adopting a Merleau-Pontian view. As I will show later, already Husserl's genetic phenomenology allows for tempering the excesses of his earlier "orthodox" transcendentalism.

nitive science have the right to conduct their own research in a relatively independent way by pursuing their specific methodological objectives, even if they share the same topics and issues. Phenomenology has much to say regarding the constitutive conditions of conscious phenomena, despite that its explanatory powers cannot reach their neurophysiological underpinnings (Pokropski 2022).

Although Husserl has always been a staunch adversary of naturalism, even his account of phenomenology can be rendered compatible with milder, non-reductionist forms of naturalism without losing its disciplinary specificity as regards both its methodological and ontological requirements. Husserl′s antinaturalism does not question the legitimacy of the naturalistic attitude shared by the empirical sciences, but it is rather directed against its indiscriminate extension to domains unrelated to scientific inquiry as well as its naivety. Put differently, phenomenology can be integrated with (embodied) cognitive sciences, provided it is not committed to subscribe eliminitavist or physicalist views, according to which conscious experiences have no autonomous real consistency or are regulated only by physical laws, as the causal closure principle demands. Hence, two preconditions must be fulfilled so that a fruitful exchange between phenomenology and empirical sciences of the mind can be promoted: 1) far from conflating them with hidden computational or physiological processes, conscious experiences must be recognized in their genuine way of being, without prejudice to their relationship of dependence on the former; 2) the lawful regularities to which conscious experiences obey in their course can be formalized only to a certain extent. Even the most promising and sophisticated explanatory tools provided by dynamical system theory fall short of exhausting the virtually infinite manifold of conscious states we can entertain as well as their combination, when attempting to predict their future course (Pokropski 2022).

For Reynolds (2017: 41–42), a suitable candidate for such a weak form of methodological naturalism is the Liberal Naturalism of De Caro and Macarthur (2022), which qualifies for three fundamental theoretical requirements: 1) the rejection of the strong epistemological and ontological claims of scientific naturalism such as causal closure principle and the admission into the ontological world′s inventory of only (basic) physical entities; 2) consideration for both evidence and methods of the empirical sciences of nature; 3) the refusal to admit in the ontological inventory of the world supernatural entities and forces. As regards the second point, I agree with Reynolds′ view that consideration and respect are not to be declined in terms of deference toward science. Philosophy

performs no subordinate function in relation to science but can cooperate with it as a partner of equal rank. A fruitful dialogue between phenomenology and cognitive science can only be established by recognising two fundamental conditions. Firstly, it must be admitted that some domains of reality such as values, norms, personal selves, meanings and the like remain precluded for reasons of principle from empirical investigation. Secondly, there are qualitative and structural aspects of our intuitive experience of the world that resist to be amended or substituted by means of scientific evidence - e.g. perceptual illusions and context-bound common sense beliefs.

Two further versions of weakened naturalism have recently been proposed by D. Hutto (2022) and S. Gallagher (2018; 2022) within the context of the radical enactivist approach they share. Hutto speaks in favour of a "relaxed naturalism" whose main tenet consists in vindicating a pluralistic epistemological framework in which both natural and human sciences can synthetically converge toward an integrated unitary worldview, even using different methods. More radically, and this is the view I am endorsing here, Gallagher contends that the convergence of phenomenology and empirical sciences of mind should not concern only their possible achievements, but also involve the critical contribution phenomenology can offer in redefining the concept of nature, which does not consist in a collection of objective facts detached by any observer, and the methodological requirements for research as far as these should also take into account the peculiar features and the first-personal mode of givenness of conscious phenomena. Nature is unthinkable apart from the participation of a plurality of embodied and enactive subjects who among other things practice science (Husserl, 1993: 323 ss.). Science too, like any human enterprise, has its roots in an intersubjectively shared life-world since it descends, in Husserlian terms, by the more or less deliberate adoption of a naturalistic stance which is not our primary concern as personal beings living and acting in such a world. Not only any observer is integral part of the physical reality she investigates, but the subject itself is the main target of cognitive sciences and as such cannot be dissolved in a bundle of impersonal processes to be framed in objective terms independently of any observer. Embodied subjectivity does intrinsically belong to both physical and biological reality not only as an object for empirical research but also as a transcendental condition for accessing and constituting them in their meaning: to paraphrase Merleau-Ponty (1963: 201), the only truth of naturalism is highlighting this relation of dependence.

This point is exemplified by the concepts of situation and affordance. Every conscious agent is embedded in an environment defined not primarily as an objective space where physical objects are located, but as a surrounding world populated by things that are salient for the organism to the extent that they satisfy its vital needs and have a meaning for it. Affordance and situation are relational concepts that bring into play the conjunction of both the embodied subjects and their environment. So transcendental phenomenology looms as the necessary counterpart of cognitive sciences as far as it maintains with them a fruitful relation of "mutual enlightenment" within a multidisciplinary context where no single science alone can claim the last word about the true ontological consistency of organic nature, conscious experiences, life-world and subjects. If in ecological psychology affordances have been conceived mainly in terms of physical properties of both the environment and the responses it elicits by organisms, they have undeniably an experiential correlate and depend on subjective conditions of the cognitive agents. This topic can therefore constitute a common intersection area for both research fields. Husserl himself has repeatedly underlined throughout his whole work how the world manifests itself to us as a world 'at hand' that imposes demands, stimulates desires and needs, invites us to act in it and make use of the things with which it is populated (Husserl, 1989: 191-192).

The co-emergence of embodied subject and world from a phenomenological-genetic perspective has been a primary source of inspiration for enactivism. As noted by Depraz (1999: 468), more than static phenomenology, genetic phenomenology seems better suited to allow for such a kind of naturalization of transcendental subjectivity free from reductionist assumptions and compatible with its requirements. The weak kind of naturalism tolerable within a Husserlian framework goes hand in hand with the dynamical process of transcendental constitution. Husserl himself insists throughout his middle and later work on the intimate mutual belonging of real-mundane and transcendental subject. It happens by virtue of an essential necessity that transcendental subjectivity has already undergone from its very beginning a process of naturalization and mundanization in a manifold of concrete, monadic subjects who are anchored thanks to their bodies both in a spatio-temporal world and in a surrounding environment reflecting their needs and goals (Husserl, 1973: 636 ss.).

As regards the contribution genetic phenomenology can offer to sciences of mind (Reynolds, 2017: 56-58; Pokropski, 2022: 19-20), Husserl himself affirms that it has explanatory powers, whereas static phenomenology

limits itself to provide descriptions. Genetic phenomenology aims at retrospectively reconstructing the passive processes which lead, for example, to the accomplished constitution of things and worldly space thanks to the bodily kinaesthesias or connote our experience of time, like affective and emotional factors[13]. Moreover, the move toward genetic phenomenology entails that the distinction between the transcendental and the empirical has to be blurred. Phenomenology needs to open to science so that both can ensure a deeper understanding of the causal factors that preside over the ontogenetic and phylogenetic development of cognitive agents.

A recent interesting account inspired to a revival of Husserl's genetic phenomenology is the "Integrationist View" proposed by T. Netland (2020). The concepts of transcendental and nature must be transformed to allow for the mutual integration of phenomenology and empirical sciences of mind. Once that consciousness has been reformulated in terms of a behavioural structure that is superordinate to the distinction between subject and object, first-person and third-person perspective, it is possible to promote such an exchange. Transcendental phenomenology has not only the task of elucidating the essential features of a subjectivity detached from the world but concerns above all the correlation between subject and world. Furthermore, transcendental phenomenology does not superimpose like Kant′s traditional deductive approach the structures of a legislating intellect on the raw materials provided by sensibility in a top-down fashion. Rather, phenomenology denies the principal separation between intellect and sensibility and tries to discover how the transcendental structures of subjectivity do emerge from and within experience in its genetic development. As already pointed out by D. Zahavi (2004: 341-342), Husserl′s transcendental is not a formal and conceptual array of a priori principles superimposed to experience and axiomatically deduced from an abstract egological instance, but it emerges from the structure of experience itself and is transformed continuously during its dynamic course.

Both transcendental phenomenology and empirical science are anchored in experience: hence, they differ not as regards their respective objects but in their attitude to the same domain. If common target is the embodied subject in its belongingness to the real world, then the difference between transcendental and natural must be blurred. Scientific findings can also alter our intuitive image of the subjects we are at least to some degree and, therefore, affect the

[13] See of Husserl *Static and Genetic Phenomenological Method*, in Husserl, 2001: 629.

eidetic descriptions in the context of transcendental inquiry which are nourished by this image. In other words, a priori transcendental considerations are not immune to errors and can be modified according to empirical results. Hence, the "mutual enlightenment" of transcendental phenomenology and natural sciences of mind must necessarily result in a contamination or encroachment between both fields: one the one side, eidetic investigation must take into account possible corrections deriving from empirical research, on the other, empirical research deserves transcendental relevance to the extent that its achievements contribute to cast light to the way subjects access their world and to a renewed consideration of nature as intersubjectively constituted, against every form of naive objectivism. A good candidate for such an integrative approach is the topic of embodiment. Embodiment is an essential feature fully belonging to the transcendental constitution of the subject, as far as it plays a pivotal role in disclosing a perspectival space and an oriented world. At the same time, embodiment is also a biological phenomenon whose actual operating can only be explained by empirical science. As stated by Roy et al. (1999: 61): "The *Leib* is one manner in which the lived body shows itself, and thus the locus where a *transcendental analysis and a natural account are intrinsically joined".*

5. The lived body as the turning point from transcendental to empirical inquiry

The concepts of *Leib* and *Lebenswelt* play the role of nondual phenomenological expressions of nature and spirit, understood in the secularized meaning of cultural world. In other words, their operative relevance pushes in two directions at once, toward a denaturalization of nature and a despiritualization of spirit (Depraz 1999: 471). Depraz (1999: 467) warns also against the risks of a "hypertranscendentalism" due to a substantialization of consciousness. Husserl himself is careful enough not to take his transcendental stance to these extremes. After all, transcendental consciousness depends on the impressions and on the hyletic materials which appear to come to it as from the outside and are therefore not posited by itself[14]. The constitutive structures of transcendental

[14] An interesting version of non-objectivist metaphysical naturalism is the "panqualitism", recently proposed in the wake of E. Mach's neutral monism by D. Chalmers and S. Coleman. Before the subject-object distinction there is an impersonal stream of not yet felt hyletic qualities which are properly situated at a proto-phenomenological level. Pace Giannotta (2022) tries to combine

subjectivity neither have bare formal character nor are encoded in a conceptual format but are intermingled with hyletic elements. As phenomenal qualities, they are in principle accessible to consciousness and originally given to intuition. To the extent that it is the lived body the main source of these data, consciousness is essentially embodied, and embodiment is a fundamental feature of transcendental subjectivity which belongs to its eidetic constitution. Of course, lived body has not to be identified with a particular organism but with a set of functions which allows for the emergence of hyletic sensations and their interpretive synthesis in whole percepts, perceptual objects and states of affairs. Hence, there is no insurmountable gulf between transcendental and empirical subject thanks the mediating role of lived body: "Our empirical subjectivity embodies the transcendental by instantiating through its own organic processes the functions that characterize the transcendental" (Mensch, 2013: 226).

Husserl's embodied "I can" as the first expression of functioning intentionality, as defined in his late work, is the most primordial form of transcendental subjectivity (Husserl 1989). Husserl's "I can" consists not only of sensorimotor cues, but also of hyletic and bodily elements which exert some constraints on our capacity of acting and perceiving and even on our higher-level cognitive performances (Gallagher, 2022: 79-80). Since functioning intentionality does involve embodiment and embodiment is an essential requirement for a human subject, the "I can" is placed at the intersection point between empirical and transcendental subject. Husserl himself repeatedly defines the body as the "turning point" (*Umschlagspunkt*) from transcendental subjectivity to mundane reality (Husserl, 1989: 169), by stressing its fundamental belongingness to the transcendental-phenomenological inquiry. This applies in some degree also to the material layer of the body since it constitutes together with the lived body an inseparable whole and it is a condition for efficaciously interacting with worldly objects. The lived body can act as the locus of mutual involvement of the empirical and the transcendental since it is not only a constituted object, but also participates to the transcendental conditions of possibility of experiencing a perspectival space and an oriented world populated by things. Husserl himself envisages the possibility of a somatology, namely a natural science of lived body as complementary to psychology, whose role consists in highlighting the contribution of lived body to the constitution of perceptual objects and space, as

this view with the enactivist phenomenology of lived body as the first immediate self-affection of a living being which performs the function of first ″material″ condition for the emergence of consciousness.

well as the dependency of mental states on bodily sensitivity and motility (Ramstead, 2015: 83).

Experienced from a first-person perspective as a unitary organ of perception and action, the lived body is the centre to which all aspectual forms of the surrounding objects are referred and a freely movable organon, given some inescapable anatomical constraints. Lived body occupies an absolute centre of orientation and zero-point of a perspectival space that coincides with its current perceptual field. Husserl contrasts this concept of body with that of body as object, namely the body constituted like every other material thing in the perceived world. Conversely, lived body is not a thing, but the subjective bearer of a motor intentionality that serves as the primal layer of intentionality in full-fledged sense. This kind of intentionality manifests itself in the kinaesthesias which are concomitant to perceptual acts[15].

Kinaesthesias play a crucial role in perception and reveal it in its nature of dynamical and continuously flowing event, far from being a succession of discrete snapshots. Kinaesthesias are organised in a manifold of subsystems, each of them related to a bodily organ, and fulfil a dual function. On the one side, kinaesthesias ensure the self-organisation of the raw sensory materials in a whole percept, according to which Husserl calls "passive synthesis", before any intervention of a higher-order intellectual act of categorisation. On the other, they motivate the intentional reference of every perceptual partial appearance of an object to it and characterise perception as an action-driven exploratory function. It is thanks to kinaesthesias that objects constitute themselves in their identity: I need no previously stored concepts to fix them, because they are directly given to me already in their perceptual appearances. In perception I always grasp – in Husserl's terms: I apperceive – of the object more than what is currently given: its hidden sides are simultaneously co-given to the extent that they are anticipated by kinaesthesias I could accomplish as something that I can actualize in the following perceptual courses.

Kinaesthesia can be defined as the subjective awareness of bodily movements as far as they are inwardly experienced and freely carried out by the lived body. Between the kinaesthesias performed by the lived body and presenting sensations a motivating relationship obtains. Presenting sensations comprehend both exteroceptive and interoceptive sensations and provide the material

[15] Husserl insists repeatedly throughout his whole work on the motivating role of kinaesthesias in perception and on the kind of motor, operative intentionality they allow for. For a comprehensive treatment of this topic see Husserl, 1997, sections III and IV.

basis of perceptual acts as far as they fulfil in different degrees their meaning intentions, whereas kinaesthesias enable the experience of being immersed in the oriented space disclosed by the lived body and allow for active exploration of our surrounding world. Presenting sensations alone do not suffice to convey information about the existence of objects as independent realities in their own identity. Their function is restricted to present a sensorial field, qualitatively connoted according to this or that sensorial mode, which fills an extension. In order for a sensorial field to be structured as a stable perceptual schema within an ongoing flow of perceptions, it needs to be yielded by kinaesthesias and the corresponding adjustment movements accomplished by my sensory organs. At a higher level, these perceptual schemes turn to reveal themselves as characterizing features of the real things, since kinaesthesias allow for the reciprocal coordination of aspectual forms that follow each other during perception and for their reference to the same object.

To this regard Husserl can be considered as a forerunner of the sensorimotor account[16]: every kinaesthetic motion elicits a set of sensory appearances which on their turn call for further movements and so on. The clause "if-then" expresses this basic functional relationship of dependence of presenting sensations on kinaesthesias. To the same course of kinaesthesias the same belonging course of presenting sensation is associated, without every single kinaesthesia being inseparably bound to a specific presenting sensation. All that is required is an invariant structure of correspondence between both orders, according to certain syntactic rules: to every variation in bodily movement, it corresponds an alteration of the way of presentation of both the object and the whole perceptual scene. Perceptual appearances are organized in a synthetic, unitary course so that each of them intentionally refers to the next one and all together to the same object. No perceptual course is exhausted by the partial aspects of the things that manifest themselves here and now but is from the very beginning inscribed in a horizonal framework established by bodily kinaesthesias. Perceptual experiences are altogether gathered within a concordant structure, so that each of them contributes to different degrees of accuracy to the optimal apprehension of the objects in their constancy and in their richness of properties. For this I need to move my body near to the object and to modify

[16] Representative examples of sensorimotor accounts recently developed within enactivism are to be found in Noë 2004, 2009. Di Paolo et al. (2017) provides a highly sophisticated attempt at modelling in formal terms the sensorimotor contingencies occurring during the execution of actions and even of cognitive tasks.

through its interventions the external circumstances that enable me to an optimal grip. Thanks to their anticipating function, kinaesthesias allow to readjust in a more precise and fine-grained way the perceptual field, until it reaches optimal levels of organization. Therefore, kinaesthesias essentially contribute to the self-organization process of sensorial data in well-formed percepts.

Bodily intentionality discloses a worldly oriented perspectival space – in Husserl's terms a "primordial surrounding world" (Husserl 1982a) – whose absolute centre is occupied by the embodied subject, and which is given as a totality of access possibilities correlated with the sensorimotor capacities of the body. Lived body plays a pivotal role as the central member of a unitary and integrated structure I-body-world. This bare natural world is immediately given in my primordial perceptual sphere irrespective of all its personal and cultural meanings and extends within variable boundaries that are commensurate with the embodied agent's possibilities to access it and to act in it.

The lived body lies at the centre of a space of coordinates related to its absolute "Here" like right/left, above/below, before/behind. This system corresponds to a prolongation of the anatomical structure of the body and represents its outer projection in height, along the vertical direction head-feet, in width, along the horizontal direction right hand/left hand, and depth, which arises from body's capacity of locomotion. In this surrounding world objects are located at varying distances from the absolute "Here" and offer themselves only through partial perspectival profiles, according to the movements and changes in position of the lived body. Whereas other bodies than mine do occupy only relative positions in the outer space, the absolute "Here" of the lived body is in relation to myself a fix place that moves with me and from which I cannot depart, and a relative one to objective space. Locomotory kinaesthesias allow for the shift from a proximal space to a distal one, which has to be understood as the ideal continuity of all possible proximal spaces surrounding my body in every position it can occupy, according to its motor capacities. This space is defined as an open horizon that I can freely expand and in which I can perceive objects from every possible point of view (Husserl, 1997: 265, 328-329).

In this view, the cognitive agent is not a mere spectator foreign to the world, posited in front of it as a passive receptor of stimuli which its brain should reproduce and reprocess, but something comparable to a dynamical system, constituted by the sub-systems brain and body and coupled to the surrounding world it enacts, which on its side counts too as a dynamical system. Husserl's theoretical framework can be formalized in mathematical terms by defining the

covariations occurring between these systems and extending the scope of syntax and computation from the sub-personal level of brain architecture to the conscious one of perception and action. In referring to her environment the cognitive agent is ongoingly coupled with it and needs not to "represent" what she perceives or does in order to control and carry out a purposeful action. To this regard, Husserl draws a rigorous distinction between "presentation" and "representation" aiming at highlighting the direct relationship between perception and its intentional correlate, which is given "in flesh and bones" (*leibhaftig*) to the embodied subject without any need of symbolic intermediaries, whereas "representation" concerns the hidden sides of a perceptual object as well as what is remembered or anticipated of it. Instead of representations, perception does provide appearances: before of representing them, a cognitive agent must be able to access and to grasp objects in her environment. Phrased in Husserl's own words: "The perceiving, when I consider it purely as a consciousness and disregard my body and bodily organs, appears like something which is, in itself, inessential: an empty looking at the Object itself on the part of an empty "Ego" which comes into a remarkable contact with the Object" (Husserl, 1982b: 83).

6. Conclusions

The results I tried to achieve in this essay can be summarized as follows: 1) Husserl's transcendental phenomenology should be deflated for the purpose of a collaboration with the empirical sciences of mind as long as both meet the same requirements of scientific exactitude and are free from dogmatic assumptions; 2) phenomenological psychology should be considered as a common terrain for the encounter between transcendental phenomenology and empirical sciences of mind, as long as it shares with the former its eidetic character and with the latter its autonomous explanatory relevance; 3) a phenomenologically inspired embodied cognitive science should not limit itself to establish mere correlations between neuronal processes and phenomenal experiences as well as to exploit phenomenology as a mere auxiliary tool, but adopt a multi-layered ontological framework similar to Husserl's one; 4) a further step in this direction is the resolute endorsement of a liberal naturalism which is respectful of the authority and autonomy of natural science and philosophy and at the same time allows for a critical redefinition of both; 5) the theme of lived body can serve as a common research field for phenomenology and embodied cognitive science, since a) it

plays a pivotal role as a major component of transcendental subjectivity in constituting a world through its sensorimotor capacities and b) it is liable to experimental investigation thanks to the possibility of modelling in formal terms conditional relations between kinaesthesias and presenting sensations.

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