Building a Science of Experience
Neurophenomenology and Related Disciplines

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> Context • More than 20 years ago Varela initiated a research program to advance in the scientific study of consciousness, neurophenomenology. **> Problem** • Has Varela's neurophenomenology, the solution to the "hard problem," been successful? Which issues remain unresolved, and why? **> Method** • This introduction sketches the progress that has been made since then and links it to the contributions to this special issue. **> Results** • Instead of a unified research field, today we find a variety of different interpretations and implementations of neurophenomenology. We argue that neurophenomenology needs to give additional attention to its experiential dimension by addressing first-person methods' specific challenges and by rethinking the relationship between the frameworks of the first- and third-person approaches.
> Key words • **Neurophenomenology, explanatory gap, micro-phenomenological interview, first-person methods.**

Introduction

« 1 » To mark twenty years of neurophenomenology, we organized a conference that took place in the cities of Santiago and Valparaiso, in Chile, in January 2016. The aim of the conference was to discuss the current state, the challenges and the possibilities of neurophenomenology as a proposal for building a science of experience.[1] Both renowned scholars who have witnessed the development of neurophenomenology during these twenty years and young researchers who are at the beginning of their careers participated in the event. This special issue was conceived with the aim of capturing the main insights from the conference and its discussions.

« 2 » Twenty years ago, Francisco Varela (1996) proposed a research program that addressed the "hard problem" of consciousness. The recognition that even a complete physical description of the world could not explain the phenomenal experience of it led to a question about the gap between these two areas of description, the so-called "explanatory gap" (Levine 1983). Philosopher David Chalmers (1995) proposed to divide the problem of consciousness into an "easy" part comprised of the functional aspect of consciousness, i.e., the neural mechanisms involved in a cognitive function, say the avoidance reaction towards noxious stimuli, and a "hard" part comprised of the phenomenal aspect, i.e., the particular way in which we experience a given stimulus such as the experience of pain. According to Chalmers, with the tools of science we might one day be able to tackle the "easy" part but not the "hard problem." Chalmers argued that the phenomenal aspect of consciousness is not reducible to the functional aspect and thus implies an "extra ingredient." So, what could that extra ingredient be?

« 3 » Several different solutions to Chalmers's conception of the hard problem have been proposed, some of them trying to identify the missing "extra ingredient," others trying to show that no such ingredient is needed. Most of these solutions, however, have been conceptual in nature. Varela, by contrast, responded with a "methodologi-

1| While Varela (1996) proposed neurophenomenology as a pragmatic approach to develop a science of *consciousness* and not of experience, in this special issue, as well as in the conference that motivated it, we decided to change the focus from consciousness to experience. This choice is based in the fact that, according to our interpretation, Varela's understanding of consciousness involves the understanding of the structure of experience. This is particularly clear in the chapter "What do we mean by 'human experience'?" in Varela, Thompson & Rosch (1991: 15f). In the beginning of this chapter Varela explained the transition from Descartes's idea of a mind as a subjective consciousness containing ideas that corresponded to what was in the world, to that of Brentano's intentional mental states that lead to Husserl's procedure for examining "the structure of intentionality, which was the structure of experience itself." This might explain why in the neurophenomenology literature the terms consciousness, mind and experience are usually used in an interchangeable way (even though some authors may not agree with this equivocality). In our interpretation, Varela led the discussion away from the rather vague notion of "consciousness" or "mind" to the more concrete and "embodied" notion of experience. Therefore, it is (implicitly) assumed or (explicitly) posited that the study of consciousness refers to the study of conscious (lived) experience.

http://constructivist.info/12/2/131.editorial

cal remedy," the research program of neurophenomenology. This research program aimed to develop a science of consciousness that included, as a central component, an approach that accounts for the experiential aspect of cognitive phenomena. Without providing a theoretical answer to the hard problem, neurophenomenology proposed to add to the accepted scientific method (the so-called "third-person" approach) an experiential "first-person" approach based on techniques such as phenomenology and meditation practices to rigorously explore and provide an account for experience. In this program, a "circulation" (Varela 1996: 343) between the first- and third-person data was proposed in order that each might enrich the other through mutual constraints: "The key point here is that by emphasizing a co-determination of both accounts one can explore the bridges, challenges, insights and contradictions between them" (Varela 1996: 343). The distinctive feature of this proposal was that

> "one obtains an intellectually coherent account of mind and consciousness where the experiential pole enters directly into the formulation of the complete account, making direct reference to the nature of our lived experience." (ibid: 345)

« 4 » Varela's methodology implies a particular understanding of cognition that diverges from the well-established understanding in cognitive science, which is rooted in the framework of representationalism and whose ultimate objective is the "mechanization of the mind" (Dupuy 2009). Cognition is understood as the computation of symbolic representations, i.e., as operations performed on (mental) symbols that represent the objects of the world (or mental states). Such an understanding unavoidably implies the assumption of an outside objective world, independent of the subject, which the cognitive subject represents in her mind. Why would this be a misleading perspective? To represent an external thing would require that the environmental state directly determine the internal "representational" states of the cognizing subject. This can hardly be the case, as internal states do not passively wait for action; rather they are involved in ongoing, highly dynamical processes in which states mostly influence one another, i.e.,

> "a closed network of interacting neurons such that a change in the state of relative activity of a group of neurons always leads to a change in the state of relative activity of other groups of neurons." (Maturana 1974: 464)

Environmental states may influence (or "perturbate" in Maturana's terminology) internal states but do not determine them. Since states are continuously changing, the same environmental state perturbates inevitably different internal states, which renders the concept of stable referential relationships, i.e., representations, impossible (Peschl & Riegler 1999: 13). In addition, artificial intelligence has witnessed many insurmountable obstacles when trying to build artificial agents and robots based on the representational paradigm (mostly based on Alan Newell and Herbert Simon's (1976) physical symbol system hypothesis), including the scaling problem (representing a simple toy world does not compare with the complexity that arises from trying to represent the everyday world of a human; Dreyfus & Dreyfus 1988; Varela 1992); the frame problem (which thwarted attempts at formulating knowledge about the world and possible actions therein in an appropriate symbolic way; Dennett 1984); and the symbol grounding problem (which, simply put, points at the difficulty of grounding the meaning of symbols in anything but other symbols; Harnad 1990). All these artificial intelligence implementations suffered from the "PacMan syndrome" (Riegler 2002), i.e., their cognition was grounded in the conceptual worldview of the programmer rather then in their own internal states (see also Rodney Brook's work, which had a tremendous impact on the development of the enactive/embodied framework, e.g., Brooks 1991).[2]

« 5 » By contrast, Varela's view of cognition is rooted in the enactive framework. Based on his work with Humberto Maturana on biology of cognition (Maturana 1970) and on the analysis of living systems as autopoietic entities (Maturana & Varela 1973), cognition was understood as the behavior resulting from the autonomous and self-organized nature of living organisms and the structural coupling they establish with their environment. As Varela, Evan Thompson and Eleanor Rosch (1991) pointed out, the organism *enacts* its world on the basis of the history of the different actions the organism has performed in the world. This view renders the need for a representation of an external world obsolete because there is a co-dependency and a co-determination between organism and environment, which give way to the emergence of meaning.

« 6 » Varela's understanding of cognition implies an alternative understanding of science. Neurophenomenology emphasizes the unavoidable and intrinsic circularity in the study of mental phenomena because (research) questions about consciousness and experience are always posed, and answered, by an experiencing person, with the help of particular tools and techniques, on the backdrop of a certain history, in a certain context and from a certain point of view. Instead of ignoring such a fact, as the established representationalist approach has been charged with doing, neurophenomenology invites us to acknowledge it and to deal with it. Varela explicitly invited researchers in cognitive science who are interested in the study of experience to "attain a level of mastery in phenomenological examination" (Varela 1996: 347) and challenged the scientific community to be open to such practices. Varela expected that the understanding of cognition as *enactive cognition* would help in "loosening the hold of both objectivism and subjectivism and encouraging further communication between science and experience, experience and science" (Varela, Thompson & Rosch 1991: 238). Consequently, neurophenomenology implies a radical methodological, conceptual, epistemological, and cultural political shift, which may even have a profound impact on policy-making in academia.

« 7 » As is often the case with innovative proposals, this research program too was met with strong disapproval. In particular, there were doubts about the scientific validity of integrating the study of experience into

2| We do not want to create the impression that the failure of the representationalist program was only visible in artificial intelligence. Varela himself referred to some experiments that show why the idea of representation is problematic, such as Richard Held and Alan Hein's (1963) "Kitten Carousel» experiment, and his own work on color vision (e.g., Varela & Thompson 1990).

cognitive science. For instance, in a widely circulated yet unpublished paper Daniel Dennett stated, that

> "[f]irst-person science of consciousness is a discipline with no methods, no data, no results, no future, no promise. It will remain a fantasy."[3]

« 8 » Also, Tim Bayne (2004) questioned the neurophenomenological program. He distinguishes two strategies to "close the explanatory gap." The first strategy, which he calls the *descriptive strategy*, refers to the use of first-person techniques deriving from Husserlian phenomenology to obtain descriptions of particular experiences. Bayne argues that is not clear which are the particular features that the phenomenological method offers to assure more reliable results than those provided by introspection or other first-person methods from psychology. The second strategy, which he calls the *bridging strategy* refers to the possibility of building meaningful bridges between first-person and third-person models. Bayne analyzes the different possible ways in which the first- and third-person data could interact in order to close the gap and what it would take to build such a bridge. The author concludes that it is not clear what kind of bridge – explanatory, heuristic, causal – neurophenomenology proposes to build between phenomenology and cognitive sciences. He also argues that any of these potential bridges will consolidate the gap rather than fix it.

« 9 » However, the subsequent refinement of methods for acquiring and analyzing first-person reports (Petitmengin 2003, 2006; Vermersch 1994; Depraz, Varela & Vermersch 2003); the consolidation of neurophenomenology's theoretical grounds (Bitbol 2012; Bitbol & Petitmengin 2013a, 2013b; Petitmengin et al. 2013); and the development of specific and concrete research projects (Lutz et al. 2002; Petitmengin, Baulac M. & Navarro 2006; Petitmengin, Navarro & Le Van Quyen 2007) contributed to consolidate neurophenomenology as a valid research program with method, data and results. Still, there are many open questions such as:

- Given that Varela suggested establishing a dialogue between cognitive science and phenomenology considering that "both domains of phenomena have equal status in demanding a full attention and respect for their specificity" (1996: 345), how can we deal with the different technical requirements of these two approaches without being biased toward the framework of one of them?
- As pointed out by Sebastjan Vörös, the introduction of phenomenology into cognitive science should not be "merely a *quantitative* addition to and extension of a pre-determined framework of natural science, but it should involve a *qualitative* transformation of our fundamental understanding of nature and science" (Vörös 2014: 96, emphasis in the original). So far, we have witnessed the first-person approach demonstrating rigorous methods, which allow it to be part of the scientific endeavor. However, has science been transformed by the phenomenological stance, as Varela expected it would be? Neurophenomenology has often been reproached with this: to date, it has brought little change to the practices of science. Together with Michel Bitbol (personal communication), we do not think that this is a defect of Varela's program. It is rather a sign that the political-cultural obstacle to this fundamental change is far from being overcome.
- Further, given that, according to neurophenomenology, the phenomenal aspect of consciousness is irreducible to its physical aspect, does proposing an integration between first- and third-person data not tacitly accept the terms of the hard problem and perpetuate the explanatory gap rather than closing it (Kirchhoff & Hutto 2016)?

« 10 » Varela passed away in 2001, and the progress of neurophenomenology was first in the hands of his disciples and close colleagues, and later in those of scholars who were captivated by the ideas put forward by Varela. Curiously, as noted by Urban Kordeš (2016), in recent years neuroscientists and researchers from the "third-person side" of cognitive science have realized the need to incorporate the study of experience into their research, resulting in a blooming of neurophenomenology. The consequence was the lack of a unified "school" addressing the methodological, ontological and epistemological questions raised by the maturation of neurophenomenology. Rather, today, we find a variety of different interpretations and implementations of neurophenomenology, which is also reflected in the contributions to this special issue.

The contributions

« 11 » In her target article, **Claire Petitmengin** sheds light on the issue of diversification. She introduces the distinction between "mild" and "radical" neurophenomenology, which synthetizes very well the range of different interpretations and implementations. According to **Petitmengin**, mild neurophenomenology aims at establishing correlations between first-person descriptions and neural correlates. Its validation criterion is the correspondence between the first- and third-person descriptions. In this interpretation, the separation between subjective experience and neurophysiological processes is simply taken as given. Accordingly, finding correspondence between subjective experience and neurophysiological processes does not explain how lived experience occurs, thus leaving the "hard" problem unsolved (Kirchhoff & Hutto 2016). By contrast, without assuming the distinction between subjective experience and neurophysiological processes as given, the radical interpretation of neurophenomenology attempts to investigate the process of separation of the objective and subjective poles within lived experience. It focuses on establishing the parameters of co-constitution between subject and object. Without looking for correspondence, the criterion of validity of radical neurophenomenology is performative, i.e., it relies on the authentic realization of the introspective acts (Bitbol & Petitmengin 2013). In this way, radical neurophenomenology addresses the hard problem of consciousness by dissolving it.

« 12 » Taking the perspective of radical neurophenomenology, **Petitmengin** re-evaluates mild neurophenomenology and pres-

3| "The fantasy of first-person science," retrieved from Dennett's home page at http://ase.tufts.edu/cogstud/dennett/papers/chalmersdeb3dft.htm on 30 April 2014.

ents it as a late phase of the enactive process of co-constitution of the subjective and objective poles. Thus, the aim of mild neurophenomenology would no longer be to seek correlations between the subjective and the objective dimensions but to understand the process of reciprocal elaboration through mutual generative constraints.

« 13 » The target article by **Constanza Baquedano and Catalina Fabar** is inspired by a mild interpretation of neurophenomenology. The authors describe the preparatory process of the adaptation of an experimental paradigm based on a dialogue between first-person descriptions and third-person measurements. Their objective is to refine and to replicate previous results of an "Approach-Avoidance Task" in order to develop a methodological adaptation suitable for electroencephalographic measurement (EEG). **Baquedano and Fabar** gathered first-person reports after the task and used them to understand participants' behavioural outcomes. In this way, an iterative process of successive piloting phases was developed until the final experimental design was elaborated. By way of a concrete example, this contribution shows the relevance of considering first-person reports systematically in the elaboration of an experimental design, to ensure that experimental paradigms are measuring what they claim to measure.

« 14 » New intellectual ideas, as noted by **Petitmengin**, often trigger different interpretations. To establish whether a given interpretation is faithful to the original proposal is often a tricky question. While **Baquedano and Fabar**'s work shows a serious commitment to listening to the subjects' experience of an experimental task, it could be argued that experimental psychology already has a long tradition of doing so, as pointed out by Donald Price and Murat Aydede (2005: 245): "the subjects' verbal reports about their own cognitive states have routinely been taken as evidence for the cognitive models postulated."

« 15 » From one perspective, it might be considered unproductive to integrate this work into the discussion about the challenges of neurophenomenology since it might add conceptual confusion to the field. From a different perspective, though, acknowledging that there might in fact be a confusion regarding the principles and implementation of neurophenomenology,[4] raising discussion about the boundaries and fundaments of neurophenomenology, could be very beneficial to the field. In his commentary to **Baquedano and Fabar**'s target article, **Jean-Michel Roy** addresses this very issue.

« 16 » Consequently, questions arise such as

- What are the boundaries of neurophenomenological explorations?
- What is the difference between mild neurophenomenology and well-executed experimental psychology?

« 17 » Shaun Gallagher and Dan Zahavi (2012: 26) provide hints toward an answer:

> "The phenomenological interest in the first-person perspective is not primarily motivated by the relatively trivial insight that we need to include the first-person perspective if we wish to understand mental phenomena. Rather, the phenomenologist's focus on the first-person perspective is as much motivated by an attempt to understand the nature of objectivity, as by an interest in the subjectivity of consciousness."

« 18 » This is reminiscent of **Petitmengin**'s radical neurophenomenology. However, if we look at the neurophenomenology experimental work that has been carried out over the last twenty years (see Aviva Berkovich-Ohana's commentary for an overview of the publications employing neurophenomenology on the empirical level), we realize that (a) it is scarce, and (b) most of it remains close to what **Petitmengin** calls "mild neurophenomenology." Even one of the most paradigmatic examples of neurophenomenology, the work of Antoine Lutz and colleagues, was "only a first step," "an initial basic example in the context of the wider scope of this approach" where the ultimate goal was "to find a rigorous way to integrate a more sustained and careful examination of subjective experience" (Lutz et al. 2002: 5).

« 19 » Unfortunately, only a few studies went in that direction (e.g., Le van Quyen & Petitmengin 2002; Petitmengin, Baulac & Navarro 2006; Petitmengin, Navarro & Le Van Quyen 2007). Integrating cognitive science and phenomenological methods involves a practical challenge, in terms of technical requirements and criteria of validity, which differ for each of them. As noted by Patricia Bockelman, Lauren Reinerman-Jones and Gallagher (2008: 6) there is a different "vocabulary or semantics for concepts and constructs," which might prevent a global view that allows for the development of an experimental paradigm that satisfies the demands of each discipline. The problem is that to resolve these difficulties, the tendency has been to stick to the representational framework of cognitive science and to expect the phenomenological approach to adapt to it or to learn from it, as exemplified in the following quote

> "[T]he second methodological lesson is a reminder that psychology and the cognitive sciences already have a time-tested tradition of precision in experimentation and that neurophenomenology can benefit from attending to many of the practices involved in this tradition." (Bockelman, Reinerman-Jones & Gallagher 2008: 6)

« 20 » The problem with this solution is that it dilutes the contribution of the phenomenological framework under the criteria of validity of representationalist cognitive science. We have to be aware that the implementation of neurophenomenology does not only involve agreeing on the methodological differences between the first- and third-person approaches but being ready to question the foundations of knowledge as they are conceived in the naturalist paradigm. While cognitive science, like the natural sciences, views cognition as a fact of nature, phenomenology deals with the broader conditions of possibility for cognition to occur. As explained by Helen De Preester (2002: 641),

> "[…] phenomenology is a descriptive science, not an explanatory one like the natural sciences. Whereas phenomenology describes phenomena as they are found, the sciences try to explain phe-

4| As stated for instance by Gallagher and Zahavi (2012: 47), "The term 'neurophenomenology' […] was originally defined by Francisco Varela (1996) to signify an approach to the neuroscience of consciousness that incorporates the phenomenological methodology outlined in the Husserlian tradition. In recent years, however, the term has been used in a much looser sense to signify any kind of appeal to first-person data in combination with data from neuroscience […]."

nomena in terms of causality. As a consequence, the requirement of naturalization comes down to a separation between the motives of phenomenology and its results."

« 21 » Thus, to fully respect the phenomenological specificity as requested by Varela, and to benefit from its scope and possibilities of shedding light on the structure of our experience, a different solution is needed, as expressed by Vörös (2014: 206):

"[T]he integration of phenomenology into cognitive science doesn't amount to incorporating phenomenology into a pre-fixed theoretical and pragmatic network of natural sciences, but consists of actively reconstructing this very network in light of phenomenological insights."

« 22 » What would happen if, without imposing the framework of the natural sciences onto the study of experience, we trusted in the tools and criteria of validity of first-person methods and allowed phenomenological insights to emerge? The two remaining target articles are steps in that direction.

« 23 » In their target article, **Natalie Depraz, Maria Gyemant & Thomas Desmidt** offer a generative method of analysis of first-person reports, based on the interaction of first- and third-person data. The method was developed in the context of a study on emotional emergence, in particular that of the study of surprise with an application to depression. **Depraz, Gyemant & Desmidt**'s article presents the first steps toward an analysis procedure for first-person reports. As the authors state, their work "is not based on a conceptual deductive a priori analysis, as is customary in philosophy, or on the standard inductive analysis usually employed by scientists" (§3). They identify the categories and processes of experience while extracting and generating them from particular experiences. It is important to note that the work presented by **Depraz, Gyemant & Desmidt** is part of the program of "cardiophenomenology." This proposal aims at dealing with one of the methodological obstacles of neurophenomenology, i.e., finding a level of observation at which convergence between the first- and third-person data is possible (Petitmengin & Lachaux 2013). Depraz and Desmidt (2015) proposed to change the focus of attention from the brain to the heart and thus use a physiological measure that has a more direct subjective counterpart: emotional experience. In this way, the physiological and experiential levels of description share a common timescale. This proposal is also relevant because it is reminiscent of the often-forgotten fact that the prefix "neuro" in neurophenomenology does not only refer to brain activity but "to the entire array of scientific correlates which are relevant in cognitive science" (Varela 1996: footnote 330).

« 24 » The contribution by **Alejandra Vásquez-Rosati** deals with the exploration of emotional experience using the first-person approach with the prospect of a future integration with the third-person approach. Of crucial importance is the use of the "micro-phenomenological interview" technique, which was introduced by Pierre Vermersch as "entretien d'explicitation" (Vermersch 1994).[5] In the 1980s and 1990s Vermersch mostly applied it for educational and professional purposes. Later it became a central element of Varela's neurophenomenological program. In her article, **Vásquez-Rosati** questions the established theoretical models of emotion that reduce emotional experience to pre-established categories, and uses music to trigger and explore the quality and dynamics of emotions. The analysis of the interviews showed that bodily sensations were present during the totality of experience, but with different intensities that nuance the different temporal phases of experience. In addition, the results showed that participants became aware of their emotions through their bodily feelings. In her commentary, **Katherine Peil Kauffman** discusses how the work of **Vásquez-Rosati** contributes to integrating the *evaluative* component into the enactive "4E" approach (embodied, enacted, embedded and extended). According to **Vásquez-Rosati,** this *evaluative* component includes an affective stance that structures the relationship between the subject and the world. She claims that "[…] emotional experience is characterized by an embodied sense-making, which occurs according to the relevance of the relation world-life and the ontogeny of the organism" (§8).

« 25 » It is interesting to note that both **Depraz, Gyemant & Desmidt** and **Vásquez-Rosati**'s contributions, which are anchored in the analysis of specified experiences, provide convergent insights. For instance, regarding the structure of the experience of time, both studies found that some participants described a circular progression, different from the linear sequential succession that our natural understanding supposes. Also, they both give a primary place to the body in the understanding of emotion.

What remains to be done in neurophenomenology?

« 26 » Since the introduction of neurophenomenology much progress has been made: the theoretical basis of first-person methods has been strengthened; the possibility of a rigorous and systematic study of the experience has been demonstrated; and an increasing number of researchers recognize the importance of the experiential dimension in the study of cognitive phenomena. However, in order to achieve the deeper transformative possibilities that this research program can provide, additional attention has to be given to its experiential dimension.[6]

« 27 » On the one hand, we need to face up to the challenges of first-person methodologies:

- Working on a better understanding of the steps involved in the process of reporting first-person data. For example, in the case of the phenomenological reduction this would involve a better

5| It was first translated into English as "explication interview" to emphasize "the act of making (an experience) explicit." Since the meaning of "explication" in French and English are not congruent, the translation was changed to "elicitation interview" instead, in full knowledge that the meaning was slightly different and full of alternative connotations. Finally, in 2015, in agreement with Vermersch and Petitmengin, it was decided to use the term "micro-phenomenological interview" to make due reference to phenomenology as the main source of inspiration of the method, and also to allude to the high accuracy that is sought (Michel Bitbol, personal communication).

6| However, see the target article of **Depraz, Gyemant & Desmidt** in which the authors argue that the neuro- (third-person) aspect needs to be further elucidated and critically assessed as well.

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understanding of the *epoché* and the *reflection*.[7] How do we go about suspending our presuppositions? What do we do to redirect our attention to the acts involved in the appearance of a perceptual object?

- Advancing in the understanding of the *evocation*[8] and of the relationship between interviewee and interviewer in the context of micro-phenomenological interviews.
- Addressing the issue of whether or not verbal language can account for the pre-reflective and pre-conceptual aspects of our experience.
- Discussing whether, and how, our social, cultural and historical backgrounds affect the phenomenological reduction.
- Finally, and perhaps most importantly, advancing the consolidation of a community of researchers working on the establishment of standards and criteria of validity of first-person research.

« 28 » On the other hand, we need to rethink the relationship between the frameworks of the first- and third-person approaches. Whereas in the initial period of the neurophenomenology program it was necessary for a science of experience to grow under the aegis of cognitive science, it seems

7| *Epoché* refers to the bracketing of our presuppositions regarding the phenomenon under study while *reflection* refers to the process under which we redirect our attention from the content of our perception towards the acts involved in the appearance of such content (Szilasi 1973).

8| In the context of the micro-phenomenological interview, *evocation* is the process through which a person gets in contact with a past experience, including its sensorial characteristics, so that the experience becomes as if it were present.

that today we are ready to "take seriously the double challenge" (Varela 1996: 347) it confronts us with. In concrete terms this means

- properly training ourselves in first-person techniques,
- daring to rethink the design of experimental paradigms in order to respect the tools and requirements of first-person methodology,
- allowing the sustained and systematic observation of our experience to enlighten and expand the limits of science, and,
- importantly, asking what the political-cultural challenge is for the future, to promote, at last, the realization of Varela's vision of a phenomenologically informed science.

« 29 » As with many scholarly proposals, there are also various interpretations of neurophenomenology. Where a different "interpretation" ends and where a new discipline (as in the case of micro-phenomenology), or an old discipline (as in the case of experimental psychology), begins still seems to be an open question in need of further elucidation. Neurophenomenology is clearly a case of *scientific pluralism*: Scientific pluralism not only leads to epistemic abundance, but is also a way of coping with several issues: we cannot possibly predict the course of scientific development; we cannot come up with a single all-encompassing theory because scientific theories necessarily must remain idealized and impartial; and scientists are driven by vastly different motives and values (Chang 2012: 268ff; Vörös, Froese & Riegler 2016: §§53ff).

« 30 » Like the evolution of species, the evolution of thought is a systemic-historical process that allows a margin of change (of certain elements of the system) while maintaining its identity (Maturana & Mpodozis 2000). Beyond the different interpretations that can be made of Varela's original proposal we must accept such "evolutionary processes" in neurophenomenology, as well, if we want it to stay alive and prosper. However, the question arises as to which elements we allow to change and which identity we want to keep. Varela provided us with "a research programme open for its exploration in an open-ended manner with the structure of human experience playing a central role in our scientific explanation" (Varela 1996: 346). If this involves expanding the limits of the scientific method and finding new and creative ways to be able to establish an open dialogue between cognitive science and first-person methods, then so be it.

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References

Bayne T. (2004) Closing the gap? Some questions for neurophenomenology. Phenomenology and the Cognitive Sciences 3(4): 349–364. ▸ http://cepa.info/2260

Bitbol M. (2012) Neurophenomenology: An ongoing practice of/in consciousness. Constructivist Foundations 7(3): 165–173. ▸ http://constructivist.info/7/3/165

Bitbol M. & Petitmengin C. (2013) A defense of introspection from within. Constructivist Foundations 8(3): 269–279. ▸ http://constructivist.info/8/3/269

Bitbol M. & Petitmengin C. (2013) On the possibility and reality of introspection. Kairos 6: 173–198. ▸ http://cepa.info/2298

Bockelman P., Reinerman-Jones L. & Gallagher S. (2013) Methodological lessons in neurophenomenology: Review of a baseline study and recommendations for research approaches. Frontiers in Human Neuroscience 7: 608.

Brooks R. A. (1991) Intelligence without representation. Artificial Intelligence 47(1–3): 139–160.

Chalmers D. (1995) Facing up to the problem of consciousness. Journal of Consciousness Studies 2(3): 200–219.

Chang H. (2012) Is water H2O? Evidence, realism and pluralism. Springer, New York.

De Preester H. (2002) Naturalizing Husserlian phenomenology: An introduction. Psychoanalytische Perspectieven 20(4): 633–647.

Dennett D. C. (1984) Cognitive wheels: The frame problem of AI. In: Hookway C. (ed.): Minds, machines, and evolution: Philosophical studies. Cambridge University Press, London: 129–151.

Depraz N. & Desmidt T. (2015) Cardiophénoménologie. Les Cahiers Philosophiques de Strasbourg 38: 47–83.

Depraz N., Varela F. J. & Vermersch P. (2003) On becoming aware: A pragmatics of experiencing. John Benjamins, Philadelphia.

Dreyfus H. L. & Dreyfus S. E. (1988) Making a mind versus modelling the brain: Artificial intelligence back at a branch-point. Artificial Intelligence 117: 309–33.

Dupuy J. P. (2009) On the origins of cognitive science: The mechanization of mind. MIT Press, Cambridge MA.

Gallagher S. & Zahavi D. (2012) The phenomenological mind. Second edition. Routledge, London. Originally published in 2008.

Harnad S. (1990) The symbol grounding problem. Physica D 42: 335–346.

Held R. & Hein A. (1963) Movement-produced stimulation in the development of visually guided behavior. Journal of Comparative and Physiological Psychology 56(5): 872–876.

Kirchhoff M. D. & Hutto D. D. (2016) Never mind the gap: Neurophenomenology, radical enactivism, and the hard problem of consciousness. Constructivist Foundations 11(2): 346–353. ▸ http://constructivist.info/11/2/346

Kordeš U. (2016) Going beyond theory: Constructivism and empirical phenomenology. Constructivist Foundations 11(2): 375–385. ▸ http://constructivist.info/11/2/375

Le van Quyen M. & Petitmengin C. (2002) Neuronal dynamics and conscious experience: An example of reciprocal causation before epileptic seizures. Phenomenology and the Cognitive Sciences 1: 169–180.

Levine J. (1983) Materialism and qualia: The explanatory gap. Pacific Philosophical Quarterly 64: 354–61.

Lutz A., Lachaux J. P., Martinerie J. & Varela F. J. (2002) Guiding the study of brain dynamics by using first-person data: Synchrony patterns correlate with ongoing conscious states during a simple visual task. PNAS 99(3): 1586–1591. ▸ http://cepa.info/2092

Maturana H. R. (1970) Biology of cognition. BCL Report 9.0. University of Illinois, Urbana. Reprinted in: Maturana H. R. & Varela F. J. (1980) Autopoiesis and cognition: The realization of the living. Kluwer, Dordrecht: 5–58. ▸ http://cepa.info/535

Maturana H. R. (1974) Cognitive strategies. In: Foerster H. von (ed.) Cybernetics of cybernetics. BCL Report 73–38. University of Illinois, Urbana: 457–469. ▸ http://cepa.info/542

Maturana H. R. & Mpodozis J. (2000) The origin of species by means of natural drift. Revista Chilena de Historia Natural 73: 261–310. ▸ http://cepa.info/680

Maturana H. R. & Varela F. J. (1973) De máquinas y seres vivos: Una teoría sobre la organización biológica. Editorial Universitaria, Santiago. English translation: (1980) Autopoiesis: The organization of the living. In: Autopoiesis and cognition: The realization of the living. Reidel, Boston: 73–134. ▸ http://cepa.info/541

Newell A. & Simon H. A. (1976) Computer science as empirical inquiry: Symbols and search. Communications of the ACM 19(3): 113–126.

Peschl M. F. & Riegler A. (1999) Does representation need reality? Rethinking epistemological issues in the light of recent developments and concepts in cognitive science. In: Riegler A., Peschl M. F. & Stein A. von (eds.) Understanding representation in the cognitive sciences. Kluwer Academic / Plenum Press, New York: 9–17.

Petitmengin C. (2003) L'expérience intuitive. Editions L'Harmattan, Paris.

Petitmengin C. (2006) Describing one's subjective experience in the second person: An interview method for the science of consciousness. Phenomenology and the Cognitive Sciences 5(3–4): 229–269. ▸ http://cepa.info/2376

Petitmengin C., Baulac M. & Navarro V. (2006) Seizure anticipation: Are neurophenomenological approaches able to detect preictal symptoms? Epilepsy & Behavior 9(2): 298–306.

Petitmengin C. & Lachaux J.-P. (2013) Microcognitive science: Bridging experiential and neuronal microdynamics. Frontiers in Human Neuroscience 7: 617. ▸ http://cepa.info/934

Petitmengin C., Navarro V. & Le Van Quyen M. (2007) Anticipating seizure: Pre-reflective experience at the center of neuro-phenomenology. Consciousness and Cognition 16(3): 746–764.

Petitmengin C., Remillieux A., Cahour C. & Carter-Thomas S. (2013) A gap in Nisbett and Wilson's findings? A first-person access to our cognitive processes. Consciousness and Cognition 22: 654–669. ▸ http://cepa.info/931

Price D. D. & Aydede M. (2005) The experimental use of introspection in the scientific study of pain and its integration with third-person methodologies: The experiential-phenomenological approach. In: Aydede M. (ed.) Pain: New essays on its nature and the methodology of its study. MIT Press, Cambridge MA: 243–273.

Riegler A. (2002) When is a cognitive system embodied? Cognitive Systems Research 3: 339–348.

Szilasi W. (1973) Introducción a la fenomenología de Husserl. Amorrortu editors, Buenos Aires. Originally published in German as: (1959) Einführung in die Phänomenologie Edmund Husserls. Max Niemeyer Verlag, Tübingen.

Varela F. J. (1992) Whence the origin of perception? A cartography of current ideas. In: Varela F. J. & Dupuy J. P. (eds.) Understanding origins: Contemporary ideas on the origin of life, mind and society. Kluwer, Boston: 235–263. ▸ http://cepa.info/2074

Varela F. J. (1996) Neurophenomenology: A methodological remedy for the hard problem. Journal of Consciousness Studies 3(4): 330–350. ▸ http://cepa.info/1893

Varela F. J. & Thompson E. (1990) Color vision: A case study for the foundations of cognitive science. Revue de Synthèse 111(1): 129–138. ▸ http://cepa.info/1951

Varela F., Thompson E., Rosch E. (1991) The embodied mind: Cognitive science and human experience. MIT Press, Cambridge MA.

Vermersch P. (1994) L'entretien d'explicitation. ESF, Paris.

Vörös S. (2014) The uroboros of consciousness: Between the naturalisation of phenomenology and the phenomenologisation of nature. Constructivist Foundations 10(1): 96–104. ▸ http://constructivist.info/10/1/096

Vörös S., Froese T. & Riegler A. (2016) Epistemological odyssey: Introduction to special issue on the diversity of enactivism and neurophenomenology. Constructivist Foundations 11(2): 189–204. ▸ http://constructivist.info/11/2/189