E. Christopher Mare

Fielding Graduate University

HOD Doctoral Program

Comprehensive Assessment 3

1 May 2012

In this third Comprehensive Assessment essay, I will discuss and critique two bodies of research literature and then draw some conclusions. The two bodies of literature that will be addressed are 1) the continental philosophy of phenomenology; and 2) the enactive approach to cognitive science. It will be shown that these two research traditions eventually were synergized into a third, composite project called "neurophenomenology," with an emergent body of literature of its own.

Phenomenology is the philosophical tradition initiated by Edmund Husserl in the opening years of the 20th century. The purpose of Husserl's phenomenological philosophy was to position philosophy as a "rigorous science" (Kockelmans, 1967, p. 26), with the intention that "this philosophical science is to provide the foundation for all other sciences" (Hammond, *et al*. 1994, p. 15). Husserl believed there was a major "*crisis* of European sciences" (Husserl, 1936, added emphasis), a crisis induced by the insistence to regard the abstract symbolism of mathematics as tangible reality. This crisis assumed ideological proportions under the aegis of "logical positivism" (Ayer, 1952), an ideology which proclaimed that "empirical, factual sciences are the only legitimate form of knowledge, replacing religion, metaphysics, and philosophical speculation as valid knowledge" (Bentz & Shapiro, 1998, p. 27). "Husserl thought it necessary to

undermine the scientific realism which positivism mistakenly assumed, and replace it with transcendental phenomenology" (Hammond, *et al*, p. 10).

Transcendental phenomenology was a "return to the things themselves," as Husserl was fond of saying, "the search for "essences"" (Sanders, 1982, p. 354). Yet, already at the outset of his project the choice of language was problematic; for, "transcendental" evokes impressions of states that are elevated or ethereal, removed somehow from "the things themselves." If Husserl's purpose was to establish a "foundation" for the sciences, then he may have been more successful using grounded terminology instead of language that recalled the abstract symbolism he sought to undermine and replace.

Hammond, *et al*. (pp. 24-9) explain that "transcendental" is intended to refer to a "transcendental subjectivity," a hypothetical "pure Ego" that was projected to exist prior to the world. Husserl's purpose here is to maneuver his concepts into a position to provide support for his notion of *epoche*, a presuppositional attitude of perception. In his own words:

> Thus the being of the pure ago and his *cogitationes*, as a being that is prior in itself, is antecedent to the natural being of the world – the world of which I always speak, the one of which I *can* speak. Natural being is a realm whose existential status…is secondary; it continually presupposes the realm of transcendental being (Husserl, 1977, p. 21, as cited in Hammond, *et al*. 1994, p. 29).

"This 'realm of transcendental being' is that of the pure Ego and its cogitationes, now described as 'transcendental' precisely because of its presuppositional relationship to the world…" (Hammond, *et al.* p. 29).

By continually referencing a realm of "transcendental being," a realm by definition removed from the everyday lived experience of "natural being," Husserl was perpetuating a

Cartesian dualism: the mind he wanted to access in his pure philosophy was situated transcendentally while the focus of its attention was a natural realm "whose existential status…is secondary." A transcendental perspective may be "pure" because it is untarnished by the sensual residues of "natural being;" yet, for the very reason that it *is* transcendental, and thus removed from these sensualities, it has limited awareness of what it is like to be-in-the-world. This was also the critique of logical positivism: its relevance to "real life."

Husserl's students, much to his chagrin, tended to embark on fundamental revisions of his "pure" philosophy while still calling it phenomenology. Martin Heidegger, for instance, began formulating what he called an *Existenzphilosophie*, an existential phenomenology to contrast with his mentor's transcendental phenomenology. David Carr, the translator to Husserl's *The Crisis of European Sciences and Transcendental Phenomenology*, states in the introduction (1970, pp. xxv-xxvi): "existentialism had given needed expression to something real: a deeply felt lack of direction for man's existence as a whole, a sense of the emptiness of Europe's cultural values, a feeling of crisis and breakdown, the demand that philosophy be relevant to life." Existentialism arose in the space between the two World Wars, a time when it must have appeared fatuous to pursue idealistic philosophies. Perhaps becoming aware of this growing gap, Husserl introduced in his last book, written in the years 1934-37, the concept of "life-world" (1970, pp. 103-89), the explicit context of "everyday lived experience." The life-world would go on to become the very foundation of a socialized phenomenology developed by Alfred Schutz and his colleagues (Schutz, 1966; Schutz & Luckmann, 1973; Wagner, 1983).

Heidegger's existential phenomenology was very much situated in the world; in fact, in his opus *Being and Time* he called it a phenomenology of *Being*:

> Phenomenology is our way of access to what is to be the theme of ontology, and it is our way of giving it demonstrative precision. *Only as phenomenology, is ontology possible*. In the phenomenological conception of "phenomenon" what one has in mind as that which shows itself is the Being of entities…(Heidegger, 1962, p. 60, original emphasis).

Heidegger's locus of perception is not a "transcendental subjectivity" but rather *Dasein*, the situated conscious human agent. So essential is situatedness to Heidegger's ontological phenomenology, he develops a whole new conceptual vocabulary to describe the relationships involved. One of the most important concepts is that of "Being-in-the-world" – in other words, Being *requires* a world; there is no Being without situatedness in a world. What's more, in Heidegger's language, Dasein is "thrown" into a *pre-existing* world (like Nazi Germany in Heidegger's case); thus, in resonance with Gadamer's hermeneutics (1975), there is intrinsic "historicality" to Dasein's Being.

I found *Being and Time* a difficult read. Not only is Heidegger developing a precise new language to convey his meaning but his new language is further translated for the English reader. Thus, there must be a subtle distinction between what is translated as "Being-present-at-hand" and "presence-at-hand" (p. 67), yet I was never able to grasp it – and this distinction may already be a challenge for the German reader. Or, in another case (p. 149), there must be an important distinction between the native *Mitsein* and *Mitdasein* (*Being-with* and *Dasein-with*) yet this is lost to the average English reader. I found it such hard going that I stopped after about 150 pages and resorted to reading a Commentary first (Gelven, 1970). Ironically – or perhaps predictably – the author of the Commentary is at times critical of the exact translations chosen by MacQuarrie

and Robinson! Under these conditions, I am skeptical any time I see someone attempting to proffer a direct quote from *Sein und Zeit* with an air of authority.

The movement away from transcendentalism and towards a situated phenomenology that began with Heidegger was further accentuated by the "embodied" phenomenology of Maurice Merleau-Ponty. Merleau-Ponty's *Phenomenology of Perception* (1962) is a text often cited by the "embodied cognition" proponents that will be reviewed next; this is because Merleau-Ponty paved the way for a *subjective* account of consciousness: "We are caught up in the world and we do not succeed in extricating ourselves from it on order to achieve consciousness of the world [as the positivist would aver]. If we did we should see that the quality is never experienced immediately, and that *all consciousness is consciousness of something*" (1962, p. 5, added emphasis). Thus, for Merleau-Ponty, phenomenology is not the purview of a purported "transcendental Ego," nor is it the philosophical account of a "situated Dasein;" rather, phenomenology is inherently *the study of consciousness* as it is experienced subjectively by individual human beings moving through and interfacing with the (a) world.

Merleau-Ponty was adamant about this subjective, embodied orientation because of the perceived *dis*-orientation that results from a so-called 'objective,' empirical scientific account. It should be remembered that when Merleau-Ponty wrote, in the mid-1940s, scientific empiricism was the unquestioned legitimate worldview; thus, an embodied phenomenology positioning itself as the locus of consciousness was very much on the edge. Perhaps for this reason, Merleau-Ponty was careful to make detailed studies of how bodily phenomena are experienced subjectively, as, for example, when encountering other "selves" (pp. 346-65) or when moving through "space" (pp. 243-98) – and in this latter case making a clear distinction between the absolute and abstract

"geometric" space of the scientific worldview and the relativistic medium for relationship which is first-hand experience.

While marginalized in its own day, *The Phenomenology of Perception* has gone on to become quite influential, as embodied philosophy more generally has become increasingly accepted. If I have any critique, it would be – and I hope I don't sound too ethnocentric – that I find Frenchmen to be rather rambling in their prose! I'm thinking here also of Sartre (1958, p. xxix), who mentions the phenomenology of a package of cigarettes and a glass of wine. Maybe that's it? Maybe it's customary in France to drink wine while writing and that's why it appears as rambling to me? Another observation would be that Merleau-Ponty was writing from intuition; and while he does make repeated reference to psychological studies of his day, there was not yet the surge of knowledge coming from cognitive neuroscience and its sophisticated equipment that would help to confirm his intuitions. For all these reason, Merleau-Ponty was ahead of his time.

The "enactive" approach to cognitive science may be said to have begun with the publication in 1980 of Humberto Maturana's and Francisco Varela's *Autopoiesis and Cognition: The Realization of the Living.* This was a landmark book because it introduced the theory that "cognition is a biological phenomenon and can only be understood as such" (1980, p. 7). Before this, Cartesian dualism was uncontested dogma: mind and body are separate "substances;" cognition is a purely mental function – perhaps carried on by Husserl's "transcendental Ego?" Yet for Maturana and Varela, as research biologists, cognition is the process by which an organism interfaces with its environment. Cognition is present just as much in a simple prokaryote probing its medium for food as it is in a human being deciding on a course of action: both are attempting to maintain their self-organization amidst fluctuating environmental

conditions. Thus, *autopoiesis*, or self-organization, is what defines a living system. All this can be restated in the now famous (in some circles) dictum: "Living systems are cognitive systems, and living as a process is a process of cognition" (Maturana & Varela, 1980, p. 13). Also contained in this book is a fertile statement that could be considered the seed of the enactive approach. I cite it here for future reference: "perception should not be viewed as a grasping of an external reality, but rather as the specification of one…" (p. xv).

The student-teacher team of Maturana and Varela would collaborate once again in 1987 to produce the potent *The Tree of Knowledge: The Biological Roots of Human Understanding.* This book is a follow-up to *Autopoiesis and Cognition*, yet it is much better organized. The first book sometimes felt like a running collection of notes, while the second book is presented in clearly organized sections and subsections.

In *The Tree of Knowledge*, the authors resume on the very first page of the Preface their enactive project: "Indeed, we will propose a way of seeing cognition, not as a representation of the world "out there," but rather as an ongoing bringing forth of a world through the process of living itself." Enaction *is* this "bringing forth of a world." I cannot emphasize enough how powerful this prospect is – and how completely contradictory to the objectivist-positivist-scientific worldview that *still* dominates much of the thinking, particularly in fields like economics and government – for, "bringing forth a world" implies a certain degree of self-determination. There is not a pre-given world "out there" waiting to be passively probed and measured in order to coerce its secrets; no, the world is being created and re-created again with each passing decision, with each deliberate act of cognition.

This book was an important step in my academic career; and, as a matter of fact, I am reading it for the second time in these days. It put *Life* back in the equation, as did a general

study of Living Systems Theory. Yet Biology has the advantage of tapping into the entire evolutionary process and situating *Homo sapiens* and its recurrent dramas as just another passing stage in a very long continuum. This helps to bring perspective; and believing that cognition is "bringing forth a world" helps to bring hope. As I read through the book, I am continually intrigued by the way descriptions of biological processes can be referenced back to the genesis of mental phenomena. For example:

> Thus, there is no interaction and there is no coupling without consequence for the operation of the nervous system as a result of the structural changes triggered in it. We human beings in particular are modified by every experience, even though at times the changes are not wholly visible (p. 168).

What they are saying is that experience modifies not just emotionally or figuratively but at the *structural level of the nervous system*. A given type of experience repeated again and again over the course of a lifetime will be reflected in the structural arrangement of neural patterns which will in turn reinforce a certain type of behavior. Additionally, "the changing structure of the organism follows the changing structure of the medium through a continued structural coupling to it" (1980, p. xxi), suggesting that modifying the structure of the medium will result in modified neural patterning. What Maturana and Varela are offering is a dynamic world of neural-environment plasticity. With this in mind, I was amazed to discover that the author's use the phrase "biological phenomenology" (1987, p. 13) to describe their work!

The third book in this body of research literature that I would like to cover in this Comprehensive Assessment is *The Embodied Mind: Cognitive Science and Human Experience*

(1991). Here, biologist Varela teams up with philosopher Evan Thompson and psychologist Eleanor Rosch. I do believe *The Embodied Mind* is the most important book in my canon as I approach my dissertation – so it may be difficult finding points to critique; nevertheless I will try.

In *The Embodied Mind* (p. 9) the enactive approach is finally named explicitly:

> We propose as a name the term *enactive* to emphasize the growing conviction that cognition is not the representation of a pregiven world by a pregiven mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs.

The themes being developed in the first two books now come to ripe sophistication in this third – yet the third also goes beyond the previous by incorporating new material, such as recent developments in cognitive science, including issues concerning symbolic and computational theories of mind, phenomenology as *the* philosophy of human experience, and even the perspective of the Madhyamika Tradition of Buddhism. All in all, such varying perspectives make for a well-rounded introduction to the "embodied mind."

Yet what is the purpose of this synthesis? The authors explain in the Introduction (p. xx):

> This [book] is ultimately motivated by a concern: without embracing the relevance and importance of everyday, lived human experience, the power and sophistication of contemporary cognitive science could generate a divided scientific culture in which our scientific conceptions of life and mind on the one hand, and our everyday, lived self-

> understanding on the other, become irreconcilable. Hence in our eyes, the issues at hand, though scientific and technical, are inseparable from deeply ethical concerns, ones that require an equally deep reunderstanding of the dignity of human life.

These concerns seem prescient, on one hand, as now, twenty years later, advances in neuroimaging technology have provided cognitive science with an explosion of new data to process; and yet, on the other hand, we have seen that going all the way back to Husserl, there already was a gap between scientific theories of mind and the accounts of everyday lived experience. This *is* the recurring theme – and for Varela, Thompson, and Rosch, as it had been for Merleau-Ponty, the resolution comes from embracing the reality of *embodiment*. There is definitely continuity here: "We like to consider our journey in this book as a modern continuation of a program of research founded over a generation ago by the French philosopher, Maurice Merleau-Ponty" (Varela, Thompson, & Rosch, 1991, p. xv). This proposes an inherent connection between the continental tradition of phenomenology and the enactive approach to cognitive science, a connection which will be reviewed in the next section.

But first a few comments: I found it curious that in *Autopoiesis and Cognition* as well as in *The Tree of Knowledge*, the authors, after laying a firm foundation for the theory of a biological basis to cognition, chose to ramify their discussion in the direction of formulating *social* theories. Here's an example from *The Tree of Knowledge* (p. 193, original emphasis):

> [Social phenomena] generate a particular internal phenomenology, namely, one in which *the individual ontogenies of all the participating organisms occur fundamentally as part of the network of co-ontogenies that they bring about in constituting third-order unities*.

The language here is unnecessarily opaque. Besides, phenomenology is explicitly a *first-person* methodology, so I don't think it can be so easily transferred to the social domain. Likewise, lessons from the sociobiology of insects or even other mammals cannot be so easily transferred to human beings, whose social life is so thoroughly immersed in culture. Undoubtedly the authors realized this for they turn to a lengthy discussion of the "linguistic domain" to provide context for their reasoning: "The central feature of human existence is its occurrence in a linguistic cognitive domain" (1980, p. xxiv). This sounds to me like a rather bold and unqualified statement, and a subject perhaps better left to cognitive linguists than to cognitive biologists. For these reasons, I thought there was enough substantive insight in these books already without needing to extrapolate to the social phenomena of human beings, which, for me, is another project.

One particular outgrowth of the enactive approach ought to be mentioned before looking at neurophenomenology: There's lately been an upsurge in the use of the term "Embodied Cognition." For example, Adams (2010, p. 619) exclaims: "Embodied cognition is sweeping the planet." If this is true then there must be a delayed reaction, because the pieces were all in place twenty years ago. Shapiro (2011) has written a thoughtful book entitled *Embodied Cognition*, yet this title is a little misleading, for although he does survey the work of prominent theorists of embodied cognition, his underlying purpose is to critique their positions so as to re-substantiate "standard cognitive science" and its computational theories of mind. The position of standard cognitive science is summarized thus:

> An examination of some paradigm work in standard cognitive science reveals commitments to a computational theory of mind, according to which mental processes

> proceed algorithmically, operating on symbolic representations. Cognitive tasks have determinate starting and ending points. Because cognition begins with an input to the brain and ends with an output from the brain, cognitive science can limit its investigations to processes within the head, without regard for the world outside the organism (Shapiro, 2011, p. 27).

This position is emphatically *dis*-embodied, for *embodiment implies situatedness*; or, as Thelen, *et al*. (2001, p. 1, cited in Shapiro, 2011, p. 56) state unequivocally: "To say that cognition is embodied means that it arises from bodily interactions with the world." There is a contradiction here, for standard cognitive science studies 'mind' within the sterile confines of a laboratory; nevertheless, Shapiro uses the entire length of his book to argue that computationalism does not *a priori* exclude embodiment.

Shapiro's search for something to critique in Varela, Thompson, and Rosch's *The Embodied Mind* (1991), or in Lackoff and Johnson's *Philosophy in the Flesh* (1999), or in J.J. Gibson's *The Ecological Approach to Visual Perception* (1979) at times approaches tediousness; yet he seems to be driven on by a need to justify his research community in the perceived rivalry between "embodied cognition" and "standard cognitive science," a rivalry in which the embodied or enactive approach seems to be gaining the upper hand; or, as Adams (2010, p. 619) explains it: "The view that cognition is embodied (Varela, et al. 1991; Gibbs, 2006; Gallagher, 2005) is rapidly gaining prominence in the world of cognitive science, and is aiming for dominance." This is unfortunate language: I doubt the enactive/embodied approach to cognition is "aiming for dominance;" what it's looking for is the acceptance of subjective experience as legitimate knowledge. Considering that Shapiro senses a rivalry, it's easier to understand

disparaging statements such as: "Embodied cognition, at this stage in its very brief history, is better considered a *research program* than a well-defined theory (p. 2, original emphasis). Whether research program or theory, embodied cognition *is* "sweeping the planet" because it provides more meaning for people's everyday lived experience.

Incidentally, a recent review of Shapiro's book in the journal *Phenomenology and the Cognitive Sciences* (Martiny, 2011, pp. 297-305) had this to say: "I consider it a failure that Shapiro does not stress the part that a whole tradition, namely phenomenology, plays in embodied cognition. With its emphasis on embodiment, the phenomenological tradition has been one of the main motivating forces behind this embodied trend in cognitive science. Yet, in Shapiro's book, phenomenology is only mentioned in passing (p. 52, p. 65, and p. 216), and influential phenomenologists, such as Husserl and Merleau-Ponty, are not included…[I]f the part played by phenomenology in motivating this recent trend [in cognitive science] is left out of Shapiro's investigation, it will have some implications for the way he introduces and develops embodied cognition." Yes, most certainly; for it allows him to retain a computational theory of mind.

And now for the synergy: neurophenomenology:

Francisco Varela inaugurated the research program of neurophenomenology in his 1996 seminal paper "Neurophenomenology: A Methodological Remedy for the Hard Problem." And what is this "hard problem?" According to Chalmers (1995, p. 201, original emphasis), "The really hard problem of consciousness is the problem of *experience*;" or, as elaborated in the words of Shear (1995, p. 359), "The 'hard problem' of explaining consciousness…is that of giving an intelligible account of why experience exists at all, and also of why it is found in intimate association with

individual physical systems such as the nervous systems of human beings and other sentient creatures." Varela sought to address this so-called "hard problem" with the introduction of his new research program: "Neuro-phenomenology is the name I am using here to designate a quest to marry modern cognitive science and a *disciplined approach* to human experience, thus placing myself in the lineage of the continental tradition of phenomenology" (1996, p. 330, original emphasis).

In order to comprehend why there was a problem at all, it will be useful to backtrack a bit to understand the origins of this "modern cognitive science" to which experience is to be wed.

Cognitive science arose originally as a reaction to the prevailing Behaviorism of the early 20th century, which was itself an attempt to provide a purely scientific foundation for the emerging field of Psychology (Watson, 1914). Since Behaviorism positioned itself as 'scientific,' and thus modeled upon the objectivist epistemology of Physics, it proclaimed that the psychology of human beings could be studied most effectively by detached, independent observers without resort to intangible, distracting, even messy considerations such as 'mind' or 'consciousness.' In the words of one of its founders:

> Psychology…is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, nor is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness (Watson, 1913, in Thomas, 2001, p. 13).

What resulted is the dubious "black box" approach, where inputs and outputs are diligently recorded but where the whole process in between – mind – is duly disregarded.

By the 1950s and early 1960s Behaviorism was losing its edge with the rise of computer science and its associated formal languages and interpretivist analytic philosophy. A new paradigm of Psychology, heralded as the "cognitivist revolution," alleged that the inner workings of the "black box" could indeed be studied with these new tools:

> The cognitive position was to adopt notions derived from logical and formal analysis, putting an emphasis on syntax. In this view, the mind, like a computer, is organized by rules and operates by mental representations. Meanings or semantics are supposed to arise by mapping these rules onto classically categorizable events and objects. Unlike behaviorism, this view allowed one to look into the mind but then described it as if it were a formal system. This description floated more or less free of the detailed structure of the brain (Edelman, 1992, p. 67).

This whole "computer metaphor" – an abstract "computationalism" where the brain is accepted as the generic "hardware" upon which any suitable proprietary "software" of mind can be run – may sound very familiar; yet, Edelman, a Nobel Laureate, declares elsewhere (p. 14) that the whole cognitivist enterprise is "incoherent," "[resting] on a set of unexamined assumptions." One of its most glaring oversights is that "it makes only marginal reference to the biological foundations that underlie the mechanisms it purports to explain. *The result is a scientific deviation as great as that of the behaviorism it has attempted to supplant*" (ibid, added emphasis). According to Edelman, any viable theoretical construction of mind or mental

processes must be based upon and reflect the actual physical structure of the brain. "What is special about brains that computers, and material particles, and atoms, and *res cogitans* all lack is *evolutionary morphology*" (ibid, p. 29, added emphasis) – "the minimum condition for the mental is a specific kind of morphology" (ibid, p. 34).

In a later book co-authored with Guilio Tononi, Edelman presents further evidence from his research to delegitimize the computer metaphor. Once again, what appears most significant in the construction of mental processes is the evolutionary "organization principles" among various components of the nervous system:

> [A] quick review of neuroanatomy and neural dynamics indicates that the brain has special features of organization and functioning that do not seem consistent with the idea that it follows a set of precise instructions or performs computations. We know that the brain is interconnected in a fashion no man-made device yet equals. First, the billions and billions of connections that make up a brain's connections are not exact: If we ask whether the connections are identical in any two brains of the same size, as they would be in computers of the same make, the answer is no…Although the overall pattern of connections of a given brain is describable in general terms, the microscopic variability of the brain at the finest ramifications of its neurons is enormous, and this variability makes each brain significantly unique (Edelman & Tononi, 2000, p. 47).

Edelman goes on to explain further that the uniqueness of each brain results from "the consequences of both a developmental history and an experiential history" (ibid); thus, personal experience is indubitably implied in the mental functioning of each individual. What's more, at

the level of consciousness, or subjective experience, neuronal connectivity is never "hard-wired," to use a favorite mechanistic metaphor: new synaptic connections are made with each new experience while existing connections wither and fade with disuse – and this variability proceeds on a daily basis. The picture that is painted by recent findings in cognitive neuroscience portrays a nervous system of dynamic adaptability, both shaping and shaped by its everyday lived experience. No machine could ever match this evolutionary dynamism. For that reason, it is disappointing to hear otherwise intelligent people still clinging to the outworn mechanistic metaphors. For example, the respected neuroscientist Michael S. Gazzaniga, in a recent issue of *Brain in the News* (2011, p. 5), says flatly, "I think we will get over the idea of free will and accept we are a special kind of machine, one with a moral agency which comes from living in social groups."

And so, with the epistemological assumptions that guided early cognitive science – and in many cases still linger – it becomes easy to comprehend why the "hard problem" would arise: the cognitivist enterprise has been intrinsically and emphatically *disembodied*. The living body is the very locus of experience. Experience is *being* (Thompson, 2004, p. 382) – the type of being that comes from subjectively inhabiting a body. Each body, each nervous system, each brain is unique, shaped by its own personal developmental and experiential history. For that reason, ubiquitous statements do not apply: discoveries at the level of neuroscience must be correlated with subjective accounts. For too long, the cognitivist enterprise dismissed the subjective in its zeal to forward purely objective, scientific explanations. Varela, in his new research program of neurophenomenology, sought to find verifiable (and thus scientific) common ground between subjective (i.e. phenomenological) and objective accounts not by abandoning altogether the cognitive enterprise but by introducing a "methodological remedy" that could "bridge the gap"

(Roy, *et al*. 1999), thus lending respectability to both. In his own words: "At the very least, the hypothesis presented here provides an explicit avenue to conduct research in cognitive science as if both brain physiology and mental experience mattered" (1996, p. 344). "[W]e have in front of us the possibility of an open-ended quest for resonant passages between human experience and cognitive science. The price however is to take first-person accounts seriously as valid domain of phenomena" (ibid, p. 346).

Now that neurophenomenology has been introduced and placed in context, I would like to address some methodological considerations by discussing and critiquing a couple of actual research studies. Going to this level will help in preparation for my Dissertation, as I plan to use neurophenomenology as a research methodology.

Lutz and Thompson (2003, p. 31) distinguish two levels to the neurophenomenology research program: "At a theoretical level, neurophenomenology pursues an embodied and large-scale dynamical approach to the neurophysiology of consciousness (Varela, 1995; Thompson and Varela, 2001; Varela and Thompson, 2003). At a methodological level, the neuro-phenomenological strategy is to make rigorous and extensive use of first-person data about subjective experience as a heuristic to describe and quantify the large-scale neurodynamics of consciousness (Lutz, 2002)." This is the marriage of cognitive science and a disciplined approach to human experience – objective data correlated with subjective accounts – that Varela envisioned in his seminal article of 1996.

Lutz (2002) conducted a classic pilot study that demonstrates the essential interplay between these theoretical and methodological levels, between cognitive science and the philosophy of phenomenology. Explains Lutz:

> This recent work (Lutz, et al., 2002) studies the correlation between on-going conscious states and brain coherent dynamics during a simple perceptual task and illustrates how accounts of experience by trained subjects and experimental data from these experiences can share an explicit relation of "mutual or reciprocal constraints" (Varela, 1996). The first claim is that the basic study discussed here already validates this research program because it produces new data and illuminates their relation to subjective experience (pp. 133-4).

In Lutz's study, participants were guided through a well-known illusory depth perception task, which consisted of fixing on a "dot pattern containing no depth information" (Lutz, 2002, p. 144). After this preparation period, "the random dot pattern was changed to a slightly different random-dot pattern with binocular disparities (autostereogram). Subjects were readily able to see a 3-D illusory geometric shape (depth illusion)" (ibid, pp. 144-5). Finally, participants were asked to press a button when the geometric shape had completely emerged. While all this was going on, electrical brain activity was being recorded with an electroencephalogram (EEG). After each test run, or alternately *during* the test run, participants provided a verbal phenomenological account of the experience. Two to three sessions were recorded for each participant so that singularities might emerge and be compared against the backdrop of a collective mean.

The results proved to be very interesting, "validating" the research program as indicated. Lutz and his team felt the need to divide the trials into several "phenomenological clusters," categories of subjective experience based on self-reported degrees of readiness for the task. The

phenomenological clusters were then compared with scientific data from EEG signals looking for correlation. Among the findings (Lutz, 2002, pp. 148-9):

> We found that the preparatory state, as reported by the subjects, modulates both the behavioral performance and the brain responses that follow. The reaction times were dependent on the degree of preparation reported by the subjects: they were longer when the subjects were less prepared. The induced response…was modulated in amplitude in posterior electrodes (visual areas) in function of the degree of preparation…In this particular example of clusters we can see a similar topographical pattern of large-scale synchrony during the motor response in the prepared versus the unprepared pattern…This later pattern of synchrony correlates in the unreadiness cluster of trials with longer reaction times.

Lutz is quick to point out: "This simple case study is just a first-step but already illustrates how fertile this approach could be to identify biophysical properties and to understand their relation to experience…The objective is to pay more meticulous attention to the intimate and direct knowledge that a subject has about his/her experience and to access this knowledge in a sufficiently controlled manner so that it is compatible with the more traditional methods for the collection of neural data" (2002, p. 149). A first evaluation is: "Further refinement is needed to capture the potential richness of even this simple perceptual experience. This depends primarily on the possibility of working with subjects trained to discriminate and stabilize their experience" (ibid).

I have two observations to make in regard to this pilot study:

First, I wonder if participants sitting in a chair and gazing into a computer screen, as I am assuming is the case here, will effectively stimulate the same sensorimotor capacities activated during direct lived experience? That is, I wonder if the neurodynamics data, as measured on the EEG, is already influenced by the artificial laboratory conditions? Such artifice is commonplace in cognitive neuroscience research due to the specialized, complex, and very expensive equipment involved. For example, Cupchik, *et al*. (2009, p. 84) "sought to determine how cognitive control and perceptual facilitation contribute to aesthetic perception along with the experience of emotion." Their method was to have participants lie in a functional Magnetic Resonance Imaging (fMRI) scanner whereupon they were shown a series of images of representational paintings. Brain areas that "lit up" during the experiment were assumed to correlate with aesthetic perception. There *may be* a connection; yet, the appreciation of artwork is usually more of a whole body affair, a gestalt, as viewers tilt their head this way or that, or physically move to various viewing positions to gain different perspectives or lighting affordances. I know that the new neuroscience technology is providing fascinating insight, and the studies continue to multiply, yet I also sense a tendency toward reductionism. Enactive and embodied proponents continually emphasize the essential *sensorimotor* component to cognition (Gallagher, 2005; Johnson, 2007; Noe, 2006; Sheets-Johnstone, 2011; Thompson, 2004, 2005; Thompson & Varela, 2001; Varela, *et al*. 1991), as perhaps exemplified in Thompson's skillful statement (2006, p. 226): "The central idea of the embodied approach is that cognition is the exercise of skillful know-how in situated action." With that in mind, maybe the best way to conduct cognitive neuroscience research would be to have brain imaging scanners mounted in helmets (if that could ever be arranged), allowing participants active mobility in everyday lived

experience while they were being scanned. Wouldn't that be a more complete and authentic method for revealing underlying neural dynamics than the immobile simulations in laboratories?

The second observation is that Varela (1996), in his inaugural paper, already anticipated the need for training in a "disciplined approach" to first-person accounting in order to substantiate neurophenomenology. Accordingly, the authoritative compilation *Naturalizing Phenomenology* (1999) – where "naturalizing" is understood as aligning phenomenology with the natural sciences, as in the project of neurophenomenology – makes repeated reference to Husserlian phenomenology and its essential technique of the *epoche*, or "transcendental reduction," a "bracketing" of habitual attitudes so that essences may be perceived. Similarly, an entire issue of the *Journal of Consciousness Studies,* reprinted in book form (with commentaries) as *The View from Within: First-person Approaches to the Study of Consciousness* (1999), was devoted to a discussion of first-person methodologies. In this book, Natalie Depraz, an Husserlian scholar, contributed a pragmatic article entitled "The Phenomenological Reduction as *Praxis*," in which she explains, "the *epoche* corresponds to a gesture of suspension with regard to the habitual course of one's thoughts, brought about by an interruption of their continuous flowing" (p. 99). Additionally, it ought to be remembered that *The Embodied Mind* incorporated detailed description of Buddhist mindfulness meditation, a technique for investigating consciousness with inherent "phenomenological precision" (Thompson, 2006, p. 228). With all this conscientious preparation, it seems a bit of oversight for Lutz to exclaim in his evaluation: "Further refinement…depends primarily on the possibility of working with subjects trained to discriminate and stabilize their experience" (2002, p. 149). That could have been anticipated and rehearsed ahead of time.

The citation of one more study will help to round out this look at methodological considerations. Varela's contribution to *Naturalizing Phenomenology*, besides editing, was a piece entitled "The Specious Present: A Neurophenomenology of Time Consciousness." His purpose was "to propose an explicitly naturalized account of the experience of present nowness based on two complementary approaches: phenomenological analysis and cognitive neuroscience" (1999, p. 266). His methodology was to review prior scholarly investigations of time consciousness, especially Husserl's conceptualization of *retention* and *protention*, add his own subjective experiences, correlate all these with recent research into the "dynamics of multistability" and the "geometry of nonlinear flows," and then finally develop his own hypothesis of "the four-fold structure of nowness," complete with diagrams (p. 303). The point is that he developed a sophisticated neurophenomenological description without having to use any test equipment himself. As might be expected from the originator of the enactive approach, Varela at one point in the study provides the following context:

> As phenomenological research itself has repeatedly emphasized, perception is based in the active interdependence of sensation and movement. Several traditions in cognitive research have, as well and in their own way, identified the link between perception and action as key. It is this *active* side of perception that gives temporality its roots in living itself (p. 272, original emphasis).

And it is this *active* dimension to Neurophenomenology that attracts me to it as I approach now my Dissertation. Grounded in Phenomenology and actively exploring Embodied Cognition, these

two bodies of literature are rich in correlations that may be developed into hypotheses to contribute to the emerging field of Neurophenomenology.

References

Adams, F. (2010). Embodied cognition. *Phenomenology and the Cognitive Sciences,* 9, September

Ayer, A.J. (1952). *Language, truth, and logic.* New York: Dover

Bentz, V.M. & J.J. Shapiro (1998). *Mindful inquiry in social research.* Thousand Oaks: Sage

Chalmers, D.J. (1995). Facing up to the problem of consciousness. *Journal of Consciousness Studies,* **2**, No. 3, 200-19

Cupchik, G.C., Vartanian, O., Crawley, W. & D.J. Mikulis (2009). Viewing artworks: Contributions of cognitive control and perceptual facilitation to aesthetic experience. *Brain and Cognition,* 70, 84-91

Depraz, N. (1999). The phenomenological reduction as *praxis*. In Varela F. & J. Shear, eds. *The View from Within: First-person Approaches to the Study of Consciousness.* Bowling Green, OH: Imprint Academic, pp. 95-110

Edelman, G.M. (1992). *Bright air, brilliant fire: On the matter of the mind.* New York: Basic Books

Edelman, G.M. & G. Tononi (2000). *A universe of consciousness: How matter becomes imagination.* New York: Basic Books

Gadamer, H.-G., trans. by Weinsheimer, J. & D.G. Marshall (1975). *Truth and method.* London: Continuum

Gallagher, S. (2005). *How the body shapes the mind.* Oxford: Oxford University Press

Gazzaniga, M.S. (2011). Neuroscience challenges old ideas about free will. *Brain in the News,* Vol. 18, No. 10, November/December

Gelven, M. (1970). *A commentary on Heidegger's "being and time."* New York: Harper Torchbooks

Gibbs, R. (2006). *Embodiment and cognitive science.* Cambridge: Cambridge University Press

Gibson, J.J. (1979). *The ecological approach to visual perception.* Boston: Houghton Mifflin

Hammond, M., Howarth, J. & R. Keat (1994). *Understanding phenomenology.* Oxford: Blackwell

Heidegger, M., trans. by MacQuarrie, J. & E. Robinson (1962). *Being and time.* New York: Harperperennial

Husserl, E., trans. by D. Carr (1936/1970). *The crisis of European sciences and transcendental phenomenology.* Evanston: Northwestern University Press

Husserl, E., trans. by D. Cairns (1977). *Cartesian meditations.* The Hague: Martinus Nijhoff

Johnson, M. (2007). *The meaning of the body: Aesthetics of human understanding.* Chicago: The University of Chicago Press

Kockelmans, J.J., ed. (1967). *Phenomenology: The philosophy of Edmund Husserl and its interpretation.* Garden City, NY: Anchor Books

Lackoff, G. & M. Johnson (1999). *Philosophy in the flesh: The embodied mind and its challenge to western thought.* New York: Basic Books

Lutz, A. (2002). Toward a neurophenomenology as an account of generative passages: A first empirical case study. *Phenomenology and the Cognitive Sciences,* **1**, 133-67

Lutz, A. & E. Thompson (2003). Neurophenomenology: Integrating subjective experience and

brain dynamics in the neuroscience of consciousness. *Journal of Consciousness Studies*, **10**, No, 9-10, 31-52

Lutz, A., Lachaux, J.-P., Martinerie, J. & F.J. Varela (2002). Guiding the study of brain dynamics using first-person data: Synchrony patterns correlate with on-going conscious states during a simple visual task. *Proceedings of the National Academy of Sciences* (USA), **99**, 1586-91

Martiny, K.M. (2011). Book review: "Embodied cognition" by Lawrence Shapiro. *Phenomenology and the Cognitive Sciences*, 10, March, 297-305

Maturana, H. & F. Varela (1980). *Autopoiesis and cognition: The realization of the living.* Dordrecht, Holland: D. Reidel

Merleau-Ponty, M., trans. by C. Smith (1962/2000). *The phenomenology of perception.* London: Routledge

Noe, A. (2006). *Action in perception.* Cambridge, MA: The MIT Press

Petitot, J., Varela, F.J., Pachoud, B. & J.-M. Roy (1999). *Naturalizing phenomenology: Issues in contemporary phenomenology and cognitive science.* Stanford, CA: Stanford University Press

Roy, J.M., Petitot, J., Pachoud, B. & F.J. Varela (1999). Beyond the gap: An introduction to naturalizing phenomenology. In Petitot, J., Varela, F.J., Pachoud, B. & J.M. Roy, eds., *Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science.* Stanford, CA: Stanford University Press, pp. 1-80

Sanders, P. (1982). Phenomenology: A new way of viewing organizational research. *The Academy of Management Review*, 7, July, 353-60

Sartre, J.-P., trans. by H. Barnes (1958). *Being and nothingness.* London: Methuen

Schutz, A. (1966). *Collected papers III: Studies in phenomenological philosophy.* The Hague: Martinus Nijhoff

Schutz, A. & T. Luckmann, trans. by Zaner, R.M. & H.T. Engelhardt, Jr. (1973). *The structures of the life-world.* Evanston: Northwestern University Press

Shapiro, L. (2011). *Embodied cognition.* London: Routledge

Shear, J. (1995). The hard problem: Closing the empirical gap. In Shear, J., ed., *Explaining Consciousness – The 'Hard Problem.'* Cambridge, MA: The MIT Press

Sheets-Johnstone, M. (2011). *The primacy of movement, 2nd edition.* Amsterdam: John Benjamins Publishing Company

Thelen, E., Schoner, G., Scheier, C. & L. Smith (2001). The dynamics of embodiment: A field theory of infant perseverative reaching. *Behavioral and Brain Sciences,* 24, 1-86

Thomas, R.M. (2001). *Recent theories of human development.* Thousand Oaks, CA: Sage

Thompson, E. (2004). Life and mind: From autopoiesis to neurophenomenology. A tribute to Francisco Varela. *Phenomenology and the Cognitive Sciences,* **3**, 381-98

Thompson, E. (2005). Sensorimotor subjectivity and the enactive approach to experience. *Phenomenology and the Cognitive Sciences,* Vol. 4, No. 4, 407-27

Thompson, E. (2006). Neurophenomenology and contemplative experience. In Clayton, P., ed., *the Oxford Handbook of Science and Religion.* New York: Oxford University Press, 226-36

Thompson, E. & F.J. Varela (2001). Radical embodiment: neural dynamics and consciousness. *Trends in Cognitive Science,* Vol. 5, No. 10, 418-21

Varela, F.J. (1995). Resonant cell assemblies: A new approach to cognitive functions and neuronal synchrony. *Biological Research,* **28**, 81-95

Varela, F.J. (1996). Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies,* **3**, No. 4, 330-49

Varela, F.J. (1999). The specious present: A neurophenomenology of time consciousness. In Petitot, *et al*., eds., *Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science.* Stanford, CA: Stanford University Press, pp. 266-314

Varela, F. & J. Shear (1999/2002). *The view from within: First-person approaches to the study of consciousness.* Bowling Green, OH: Imprint Academic

Varela, F.J. & E. Thompson (2003). Neural synchrony and the unity of mind: A neurophenomenological perspective. In Cleeremans, A., ed., *The Unity of Consciousness.* Oxford: Oxford University Press

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

Wagner, H.R. (1983). *Phenomenology of consciousness and sociology of the life-world: An introductory study.* Edmonton: University of Alberta Press

Watson, J. (1914). *Behavior: An introduction to comparative psychology.* New York: Holt, Rinehart and Winston