From Unmovable Points to Structural Drift: An Introduction to Enactivism

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Abstract

This essay examines possibilities for a reflexive understanding of knowledge attainment that is grounded in the enactive capacities of living systems. Appreciating the enactivist agenda requires a dislodging of obstructions created by an accumulated history of transcendental abstractions that have sought to provide a Cartesian "unmovable point" against which knowledge claims are veridically judged. This essay traces some long-held philosophical and scientific assumptions that have limited the attainment of knowledge in exchange for the banishment of epistemic anxieties that result from a loss of absolute certainty. A brief history of this problem is presented as context for the present advocacy of an enactive approach to the pursuit of cognitive outcomes. It is hoped that enactivism may offer a stable, yet evolving, understanding of how data, information, and knowledge intersect to constitute living and learning. Implications, both moral and scientific, are shared.

Keywords: Enactivism, embodied cognition, self-organized systems

Introduction

Enactivism (Varela, Thompson, and Rosch, 1991; Clark, 2008; Thompson, 2010, 2017) and its older close cousin, embodied cognition, comprise a collection of philosophical and scientific developments that challenge the paradigmatic underpinnings of thought systems and methodologies derived from Platonism and its Neo-Platonic and Christian variations in philosophy, science, and the humanities. Though recently emerged as a systematic body of theory and practice, enactivism owes much to the 18th Century Italian philosopher, Giambattista Vico, who challenged the new Cartesian hegemony in ascendance at the time of Descartes's death in 1650. Enactivism offers an immanent alternative to the primacy of absolutist dogma in its many guises, whether religious or scientific. Enactivism seeks to comprehend and interpret the nature and relations of being and knowledge without various and persistent transcendental abstractions or materialistic reductions. It aims to offer a compelling alternative to the widely accepted view that knowledge is derived from a pre-given world, which is accurately reproduced as internal representations within individual minds and/or bodies. Enactivism challenges the veracity, nay existence, of any such representations that rely upon reception of data, whether impressed through the senses or revealed or uncovered by ideational processes, which are acted upon, reflected upon, or are, otherwise, stored and retrieved for some later purpose.

I.

> *Every reaction against Platonism is a restoration of immanence in its full extension and its purity, which forbids the return of any transcendence.* –Gilles Deleuze

The various manifestations within enactivism share a central skepticism toward prevailing certainties of either rationalists or empiricists that remain largely unshaken by generations of intellectual challenges, from Hobbes to Gassendi and from Vico to Nietzsche and from Foucault to Deleuze. Both Hobbes and Gassendi offered an alternative to Cartesian rationalism, notably focusing on the role of the sensually grounded imagination as an "absolutely indispensable step between sensual perception and more abstract cognitive faculties and was in this capacity a necessary means of understanding" (Ricken, 1994, p. 18). If Descartes' theory of transcendental abstraction is to be replaced by a science and philosophy of "pure immanence," as Deleuze (2001) would have it, it will be due significantly to Vico's early challenges to Descartes' scientism, his disdain for the humanities, and the Cartesian argument for innate ideas, which Vico dismissed with principle, *verum ipsum factum* (the truth is the made). In the translator's introduction to *On the Study Methods of Our Time*, Gianturco points out that Vico's opposition was not leveled so much at Descartes and the scientific spirit as it was against the "degeneration and dogmatizations of Cartesianism, as exemplified by Malebrancehe, Lamy, Arnauld, etc" (Vico, 1990). Gianturco quotes Maria Goretti (Lemonnier, 1958) from her introduction to Vico's *De nostri*: ". . . Vico . . . appear to us, not so much the adversary of the Cartesian spirit, as, rather, the enemy of the intellectualistic schema: a schema which forces tumultuous, contradictory human nature into the straightjacket of an absolute truth, of a truth excogitated, dreamt of, but never to be actually met with in reality."

The Platonic and Cartesian dominance of the philosophy of mind and knowledge has continued, nonetheless, despite many challenges since the 18th Century. Michael Peters (2004) points out that those writing in the critical tradition that Nietzsche inspired toward Cartesian dislodgement have not so much dislodged Platonism and its many variants as they have more often inverted it, thus making way for a body-based credo that often defines itself by rejecting what it is not. Such either-or arguments for an alternative embodiment, Peters suggests, attempt to roust the mind to make room for the domination of the body, rather than healing the Cartesian rupture between mind and body, subject and object, self and other. Merleau-Ponty's embodied phenomenology, for instance, offers a profound and detailed alternative to Cartesianism, and yet Foucault saw phenomenology's embodied search for meaning and affirmation as an inverted Platonism, whereby the body becomes inscribed with the same relations of power that were previously deployed to establish control by mind.

It will take an expanded conception embodiment to loosen the pull of the Cartesian gravity that has drawn theoretical and applied disciplines toward a conception of knowledge as disembodied abstraction, wherein the learning self is viewed as a fixed, abstract quantity engaged in mental gymnastics based on reductive analysis, memory work, and self-control. Historically, this cognitive training regimen has relegated the physical, purposeful, and emotional aspects of personhood to the level of annoying distractions that require the further exercise of mental discipline to keep them properly contained by the intellect. As with so many of our philosophical traditions and intellectual fixities, this conception of knowledge can be traced to Plato, who located the epistemological Holy Grail beyond mutability, physicality, or even time, itself. Plato placed the fundamental laws that govern our universe within the reach of mathematical thinking, which offered an independence from the mutable world that earned it the closest proximity to eternal and unchanging verities for which the gods only had full access, and toward which humanity must concentrate its intellectual efforts to attain approximations. The light of Truth, thus hidden from human experience, requires the exercise of reason and intuition to locate its remaining glimmers. The sensate aspects of living in the world of change are, thus, relegated to that metaphysical ghetto, wherein the imagination and the expressive arts may, to some extent, purge the unruly passions.

Neo-Platonism, then, came to have a prominent presence in the molding of early Christian thought and in the shaping of Augustine's theological views in the further separation of soul and mind and body, views that were fueled, too, by religious dogma regarding the carnal origin of human sin. By the time we get to Descartes twelve hundred years later, the disembodiment of knowledge and goodness is quite complete, the physical only surviving as motion and extension (and thus quantifiable), and the human body hanging on as an automaton directed by the mind and tenuously connected at the pineal gland.

Following the conviction of Galileo by the Inquisition, Descartes was most interested in ingratiating the Jesuits who controlled the Sorbonne and, thus, the center of learning. And so it was that Descartes found a prominent place for God in his, otherwise, secular science; his philosophical system would be guaranteed by God's ultimate goodness and rational purpose. Weaving his way through a theological minefield that could explode at any misstep (Schmaltz, 1999, p. 39), Descartes appropriated for his thought system an omnipotent and omniscient deity as a basis for what, otherwise, may have been viewed as a doubtable world of bodies and other mutable objects. In short, the casting of a mind-body dualism, with God as bridge between the two, offered Descartes a way to fully pursue secular certainty, while handing to God the credit that the Church demanded. Cartesianism, then, provided a way to fully pursue the enlightened subjectivity of human reason through science, while offering to God the ultimate veridical authority for the conclusions of human reason, which, in turn, were used to logically demonstrate the existence of the same God who could be counted on, in circular fashion, to substantiate the veracity of the argument.

For Descartes and all who inherited his method, God provided the bridge that reliably connected the subjective indubitability of analytical and reductive thought that were represented in the mathematically decipherable puzzles of the physical world. As modern science gained confidence and drew away from the acceptance of Descartes' theological guarantee for subjective certainty, one might say the reduction took over as the individual subjective truth yielded to a higher need to extract the subjectivity for which God could no longer vouch in the methodologies of science. In the process, the preeminince of the modern individual of the Enlightenment that Descartes helped to create began to vanish. The scientific reductionism that resulted left science with a detached perspective that Nagel (1989) referred to as "a view from nowhere." And as Bourgine and Varela (1992) would pithily note in regards to the advance of reductionism, "the Cartesian commitment to reduction that was meant to justify the replacement of the collective by the individual as the locus of actions annihilates the individual on its march toward the quark" (p. xvi).

By the end of the 19th Century, Descartes' conception of mind had become a ghostly apparition on its way to being banished entirely by a new scientific psychology of timed human reflexes and conditioned behaviors. And despite reservations by John Dewey, William James, and others regarding the behaviorists' abstracting of human experience on the one hand and the objectifying of human purpose on the other, the new physical psychology brushed aside their protests as arcane residues of philosophical thinking, which had no place in the new experimental psychology, specifically, or the new social sciences, generally.

When the mind finally reappeared on the scientific stage, it was largely due to an interdisciplinary confederation of geniuses and luminaries that assembled in New York for the first Macy Conference in 1946, with the immodest goal of creating a new interdisciplinary scientific study of control mechanisms and communication in biological and physical systems (Conway and Siegelman, 2005). Core members included Ross Ashby (psychiatrist), Gregory Bateson (anthropologist), Julian Bigelow (electro technician), Heinz von Foerster (biophysicist), Lawrence K. Frank (social scientist), Ralph W. Gerard (neurophysiologist), Molly Harrower (psychologist), Lawrence Kubie (psychiatrist), Paul Lazarsfeld (sociologist), Kurt Lewin (psychologist), Warren McCulloch (chair) (psychiatrist), Margaret Mead (anthropologist), John von Neumann (mathematician), Walter Pitts (mathematician), Arturo Rosenblueth (physiologist), Leonard J. Savage (mathematician), and Norbert Wiener (mathematician).

Given the name *cybernetics* by Norbert Weiner, the new scientific search for endogenous control mechanisms and information patterns quickly exposed basic differences among the participants of the Macy Conferences, which were convened 10 times between 1946 and 1952. There were those who supported a hard science research agenda and those who advocated a research programme inspired more by the biological and social sciences. Whereas the former focused on a mathematical approach to the modeling of mind based on data processing, transfer, storage, and manipulation, the latter sought an analog model of cognition aimed at understanding the processes of control, communication, and information in living systems. Consistent with the earlier development of social science in the U. S., a hard science approach dominated the emergence of the new science during in 1950s, which came to be known as cognitive science.

Unable as they were to unlock the actual workings of the brain, the new cognitive scientists used the architecture of the early modern computer as an opportunity to model the thought process and problem solving processes that would undergird a new rigorous science of mind. However, it did not take long for some deep-seated problems to emerge. Intended to model the operations of the human mind, the new computer design embedded the limitations of long-held rationalist assumptions into what came to be known as the von Neumann architecture. These philosophical assumptions, however, remained quite invisible to the architects themselves until the problems they set in motion could no longer be ignored.

Early computer design was based on the Cartesian model of mind as a sequential, logical calculator that manipulates a rules-based symbolic language whose correlates represent aspects of the pre-given world. The computer is charged with solving problems posed to it in its rules-based language of if-then statements by sifting through a stored repertoire of data that may be retrieved and configured to represent a solution.

Two problems quickly became apparent: Any disordering in the smallest local element of the coded language caused major malfunction in the whole system, and the sequential processing of data created a bottleneck when the system encountered large amounts of data to process, store, and retrieve. The new digital model of mind, then, was quite incapable of feats achieved by simplest beings found in the living world:

> . . . the most ordinary visual tasks, done even by tiny insects, are done faster than is physically possible when simulated in a sequential manner; the resiliency of the brain to damage without compromising all of its competence, has been known to neurobiologists for a long time (Varela, 1992).

In short, cognitive scientists discovered that the central processor computer model of mind/brain, which required vast sequentially accessed programs to accomplish the simplest of tasks, did not resemble at all the way the living things in the experiential world operate.

Over the years, these unresolved problems inspired the next generations of cognitive scientists who included, ironically perhaps, the theoretical descendents of the losing faction from the original Macy Conferences, those who looked to the life sciences and social social world to inspire and inform cognitive modeling. Representing mathematics, neuroscience, biology, technology, philosophy, economics, and linguistics, the more recent iteration of interdisciplinary cognitive science pursues an agenda aimed at modeling and understanding the self-organizing, distributed, and emergent behavior of natural living systems based on simple interaction rules and without central control units.

So it is with no small dose of irony that cognitive science, which was responsible for the simplistic and incorrect metaphor of the brain as an information processing device, is at the forefront of efforts by neurophenomenologists (Rudrauf, et al, 2003) to model thought processes as enfolded and unfolding, distributed, and self-organizing emergent phenomena that operate beyond any pre-established repertoire of strategies. As a further irony, recent developments in modeling of computer-based artificial intelligence and artificial life are based on biological and social models with self-organizing principles.

At the cutting edge of cognitive science, then, is the realization that any life-based system maintains autonomy, embodies change (learns), and enacts logics derived from its own history of intra-actions of its components while interactively coupled with the larger environment (Barandiaran, 2017):

> Autonomy emphasizes the self-organized, holistic, dynamic interdependence within self-sustaining organizations, it challenges

> representationalist realism as a way to approach agent-environment relationships by highlighting the dialectic codependence between the identity of a system and the habitat it selects, shapes and brings about through its specific mode of coupling (p. 427).

Because the conceptual basis of enactivism enshrines a relational epistemology that extends beyond individual minds or bodies to enfold and unfold an ecology of interactions by all that is living, these insights embody an ethic of being that will be crucial to sustaining a shared world of mutuality for both individual and collective.

In the remainder of this essay, I will share some of the basic assumptions and concepts that are foundational to enactivism (Varela, Thompson, and Rosch, 1991; Thompson, 2007), and I will offer some suggestions as to how this "naturalized epistemology" (Varela, 1979) may offer tools for a more productive and sustainable future of life on Earth.

Even though science in many respects has moved beyond the limitations imposed by Descartes' method, there remains with us a psychological frailty as old as our philosophical schemes to assure objectivity and to locate an invariant Archimedean point from which to operate. Varela, Thompson, and Rosch (1991) refer to this problem as a arising from a "Cartesian anxiety," one that

> . . . is best put as a dilemma: either we have a fixed and stable foundation for knowledge, a point where knowledge starts, is grounded, and rests, or we cannot escape some sort of darkness, chaos, and confusion. Either there is an absolute ground or foundation, or everything falls apart (p. 141).

However, Varela (1979) has pointed out that there is no independent access from which "to stand outside our own experience . . . and see ourselves as a unit in an environment" (p. 274). Epistemological schemes that ignore this limitation make it possible to avoid the Cartesian anxiety, but at the cost of bowing to the Janus-faced idol of absolute objectivity or absolute subjectivity. Either remedy, however, offers a false Archimedean point for cognition that is based on a cut "between the cognizing subject and the object to be known." (Varela, *Principles of Biological Autonomy,* 275)

This bifurcation has the undesirable effect of isolating human knowers from the worlds they would know, which, in effect, sets human experience against that which is essential to defining itself. Besides putting humans at odds with the ecologies for which they depend upon to be properly constituted, the capture or discovery of accurate representations depends upon the successful elimination of subjectivity and the freezing of experience into "controlled" conditions that supposedly represent the stable givenness of a world unadulterated by temporal and localized elements. In effect, Plato's search for that which is immutable lives on in these failed efforts, as does Descartes' search for the "unmovable point."(

This objectivist conception sets into motion many faulty distinctions that follow from it. In choosing an Archimedean vantage point or ultimate ground that we may label God, mind, cogito, body, or even DNA, we attribute certainty when, in fact, there is none that is not grounded by the "praxis of living as a primary experiential condition" (Maturana, 1988, 5.2). The fault lines beneath Cartesian "unmovable points" become visible as we consider that the 'knower' and the 'to be known' are components of a co-determinative process for "effective action of a living being in its environment" (Maturana and Varela, 1998, p. 29).

When enactivism is, thus, conceived as "bringing forth a world" by autonomous intra-actions and interactions of individual actors, describers, knowers, learners (Horn and Wilburn, 2005) within an environmental medium that influences and is influenced by those interactions, the separation of out-there and in-here may be seen as an unneeded and misleading distinction for a process that is beyond our ability to know it without a human knower or to describe it without a human describer.

Enactive cognition could not occur without its bodily biological grounding that, at its most fundamental level, is constituted by cells (first-order unity) that are autopoietic, i.e., self-organized by the interactions of cell components within a membrane that is sustained through those interactions. These first-order cellular unities, then, comprise meta-cellular entities (second-order unities), whether ants, antelopes, or humans, which are, too, self-organizing. The self-organizing, adaptive activities of second-order unities are constituted by internal interactions that remain consistent with the limits and possibilities of environmental conditions. These individuals interacting through language acts, whether ant pheremone trails or human speech acts, create and sustain the information-communication domain (third-order unities) that, too, are self-generating and self-sustaining within the boundary conditions established by the system members' interactions coupled within the larger environment.

Within the organizational boundary that limits a self-organizing system to becoming and being itself, the structural components that operate within those boundaries are constantly engaged in intra-actions and interactions that maintain system identity, while initiating changes that are consistent with, though unspecified by, the larger environment. The environment provides perturbations from which a fluid repertoire potential actions define possibilities for change, or learning, within self-organizing unities, whether first, second, or third order.

It is correct to say that continued actions of cells, organs, humans, or social systems are contingent upon each successive unity's structural drift within its environment, or "interaction domain" (Rudrauf, 2003, p. 34) to which it remains open, even though the specific actions of each unity is entirely structure-determined from within the organizational boundaries that define it. The autonomy, then, at each level of first, second, and third order unities negates the possibility of a biological reductionism, even though each level is imbricated with the level of unity from which it emerges as a distinct entity. Each level of an organic system is inexticably linked to others, even as the actions and behaviors at each level cannot be predicted by the organization and structures at other levels.

The import of these distinctions for the effort to reclaim a unified enactive embodiment for knowledge attainment (learning) is far reaching. First and foremost, it becomes clear that all that we know of first-order and second-order unities comes to us from our status as third-order unities. It is our languaged communications that provide descriptive accounts of operations that are essentially beyond our capacity to access them in any more direct fashion than our describer status as languaging observers allows. Even so, there is a great deal to know from descriptions of our experience, even without direct access to the biology of cognition at first or second-level operations.

We know, too, that the sources of our conscious descriptions are partially derived from sources beyond our awareness of them. Cognitive neuroscientists point out that conscious behavior that we normally refer to as "cognition" constitutes a small part of the enactive behaviors engaged in the bringing forth descriptions of our cognitive activities. Furthermore, and perhaps more disturbing to those still in the throes of the Cartesian anxiety, the conscious part of cognition is comprised entirely of a continuing series of transiently correlated neuronal ensembles, or microworlds (Varela, 1999) (Stanford, California: Stanford University Press, 1999), whose "transition between two distinct cognitive acts (such as face perception and motor response) should be punctuated by a transient undoing of the preceding synchrony and allowing for the emergence of a new ensemble. . ." (Rodriguez, 1999, p. 433).

Cognition, at its root, is a cellular behavior that begins with the boot-strapping of in-formation that occurs within an organism and its domain of intra-actions and interactions within an environment. In the enactive approach, information is defined in the "original etymological sense of *in-formare*, to form within" (Varela, 1979, p. 266). But rather than an imprinting of a representation from the environment, the environment supplies perturbations that initiate indeterminate sensori-motor actions that are, in fact, distributed throughout the body and modulate registered perturbations all along the various pathways to and from the brain in a recursive fashion. Furthermore, the registering of these perturbations is influenced by the individual's history of interactions within its environment that produce repertoires of distributed neuronal paths and configurations, or ensembles, that remain plastic. It is the sensori-motor assembling at each moment that modulates inputs to register the distinctions that constitute observers' in-formational acts:

> . . . the nervous system does not 'pick up information' from the environment, as we often hear. On the contrary it brings forth a world by specifying what patterns of the environment are perturbations and what changes trigger them in the organism. The popular metaphor of calling the brain an 'information processing device' is not only ambiguous but patently wrong (Maturana and Varela, 1998, p. 166).

The data field that comprises the surrounding environment becomes informative within the neurophysiology of the enacting agent that brings forth in-formation. This circularity between knowing and acting reflects an ontological condition that is grounded in the making of distinctions, or the foregrounding of certain elements of the ecological context that become in-formational and the backgrounding of others.

Cognition is always enactively embodied and dependent upon our status as observers, who are defined through our languaged communications as third-order unities and to which we attribute, individually, the identity of "I." (Varela, 1999, pp. 60-2). The apparent permanency of our identity as an "I" is due to the communicative capacity to narrate and describe an ongoing series of temporal neuronal ensembles at the operational level that would, otherwise, remain beyond the narrative reach of "I." The persistence of our story over time enhances the verisimilitude for a stable "I" that, indeed, masks the complex inhibitory and excitatory dance (Varela, et al, 2001) among the distributed neuronal and hormonal communications emerging and disintegrating on an ongoing basis within our embodied second-order and first-order unities. This stable "I," then, is a virtual person at the center of a first-person narrative, one who provides the link from the corporeal body (the selfless "I") to the larger social ecology comprised of other languaging humans. According to Varela, then, the virtual "I" constructs a bridge that is "neither public nor private, but partakes of both." (Varela, 1999, p. 62). This virtual self is, quite literally, the story of our both being and becoming, continuously refreshing or reloading itself like an updated web page at a dissolve rate that is entirely seamless.

Enactivism posits that cognition distinguishes itself as a story of the process that sustains it, which consists of a matrix of cognitive behaviors that are known to us only by our describing of them. The descriptions of our experiences, which may include poems, paintings, essays, and petri dishes, are artifacts of experiencing, rather than objects that can be set outside of our having experienced them. The artifacts that our experiencing supplies then provide the settings and furniture in the story that our "I" shares.

Conclusion

The enactive approach reframes cognition in a way that may heal some of the misplaced cuts that our past search for truth has wielded: cuts between mind and body, subjectivity and objectivity, individual and environment, self and other. Enactive cognition grounds knowledge in effective actions to "bring forth worlds" within dynamic environments that includes other humans and other life forms. This turn shifts away from the conceptualization of cognition from code breaking or problem solving within a repertoire of pre-given strategies, rules, individual virtues, or programs.

While re-inscribing the layered co-determinative unities of language, thought, and behavior that characterize the cognitive integrity of us human observers, the enactive approach locates humans within an ecological matrix that may achieve the ecological epistemology that is "not limited by the skin" (Bateson, 1972, p. 460). It moves us toward an epistemology of immanence that is no longer skull bound. The enactive turn may, perhaps, serve to animate a relational ethics that could produce a pragmatic side effect that benefits the planet's, and thus our own, chances to survive with its biodiversity and cultural diversity intact. Bateson (1972) spoke of resulting ontological modesty that could result from a repositioned epistemology:

> Freudian psychology expanded the concept of mind inwards to include the whole communication system within the body – the autonomic, the habitual, and the vast range of unconscious process. What I am saying expands mind outwards. And both of these changes reduce the scope of the conscious self. A certain humility becomes appropriate, tempered by the dignity or joy of being part of something much bigger (pp. 462-63).

When placed against a background of science conceived as a value-free discovery of elements from a known unknown, enactivism makes figural our constructed knowledge of knowing and "the transparency of our actions" (Maturana and Varela, 1998, p. 249). In so doing, we may hope that any remaining Cartesian anxiety that arises will not distract us further from accepting a moral accountability for the facts we value and the values that shape the facts to which we attend. Varela argued that "to the extent that we move from an abstract to a fully embodied view of knowledge, facts and values become *inseparable*. To know *is* to evaluate through our living, in a creative circularity" (emphasis in original) (Varela, 1992, p. 260). The enactive approach to embodied cognition offers no Archimedean point from which to begin this project, but it may offer a modest emplacement from which to pivot and move forward.

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