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Iconic, Indexical and Symbolic Understanding: A commentary on Anna Aragno's *The Language of Empathy*

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Introduction

As a member of a small but growing group of interdisciplinarians who are dedicated to the study of sign-processes as an multi-leveled phenomenon integral to the organization of both human and animal life, I was greatly pleased to discover that a similar line of thinking is now being championed within the psychoanalytic discourse – or is so at least to the extent that psychoanalyst Anna Aragno's trenchant and astute article, *The language of empathy*, reflects the ideas of those undertaking situated analyses of human meaning-making as it emerges from both linguistic and sub-linguistic planes of interaction simultaneously.

I should state at the outset, however, that as a self-proclaimed 'bio-semiotician' whose disciplinary training was in first, philosophy of mind and later, the neurobiology of language, I am professionally unequipped to comment on Aragno's discussion of the role of negotiating non-linguistically mediated meaning within the profession-specific context of psychoanalytic clinical practice *per se*. Therefore, as to the merits of her specific claims regarding the proper measure of psychical "distance" between analyst and analysand, or to the discussion of how best the practicing psychoanalyst, while in session, should go about negotiating, on a necessarily moment-to-moment basis, "the full continuum of experiences – from organic sensations, representational images and raw emotions, to verbal expressions, metaphors, enactments, dynamics – which constitute the vast range of unconscious meanings that are verbalized and interpreted in the clinical situation" (*5)¹, my own expertise can add nothing other than the commonplace, if still often undervalued, observation that such multi-modal communicative situations are ones that all participants to human interaction find themselves occupied in co-constructing and negotiating with one another, always. So it is precisely to the extent that the clinical psychoanalytic situation has its own unique dynamic on top of this (as I am certain that it does), I must leave the professional details of such discussion to those whose clinical experience alone can argue for or against the author's specific recommendations on practice.

With that caveat in mind, I do believe that if we generalize to the study of human meaning-making practices *in toto* Aragno's professional-specific recommendation that any effective

¹ **Note to copy-editor:** References to the target article are preceded with an asterisk before the page number of the Word document entitled "JAPA aragno 27105 9-28-07" that I received from Ms. Lynn Cullen of *JAPA* on January 8, 2008. Please replace these with the appropriate page numbers corresponding to Ms. Aragno's article as it will appear in the journal. Thank you very much! *Don Favareau*

practice of psychoanalytic listening “must be guided by the many functional organizations and forms of [semiotic understanding and their multimodal forms of] communication themselves and hence necessitates attunement to *a full spectrum of human meanings*, anchoring our investigation and interpretation of psychical phenomena in their enduring biological roots” (*33) – as well as in the more obviously apparent and symbolically organized expressions of such meanings through the cultural prosthesis of language – then we are already deep into the project of *biosemiotics* – an emerging new interdisciplinary research agenda dedicated to the study of sign processes as they manifest variously across species, and across the multi-leveled organization of all biological life.

What I will do here, then, in the spirit of the JAPA Academic Exchange, is to provide a brief overview of this emerging interdiscipline and to invite those analysts for whom Aragno’s article resonates to consider the benefits that a still-developing biosemiotic perspective on meaning-making may offer their psychoanalytic practice – and vice-versa.

What is biosemiotics?

On the website for the International Society of Biosemiotic Studies that I maintain at www.biosemiotics.org I define the interdisciplinary research agenda of biosemiotics as follows: “Biosemiotics is the study of the myriad forms of communication and signification observable both within and between living systems. It is thus the study of representation, meaning, sense, and the biological significance of *sign processes* – from intercellular signaling processes to animal display behavior to human semiotic artifacts such as language and abstract symbolic thought. Such sign processes appear ubiquitously in the literature on biological systems. Up until very recently, however, it had been implicitly assumed that the use of terms such as *message*, *signal*, *code*, and *sign* with respect to non-linguistic biological processes was ultimately metaphoric, and that such terms could someday effectively be reduced to the mere chemical and physical interactions underlying such processes. As the prospects for such a reduction become increasingly untenable, even in theory, the interdisciplinary research project of biosemiotics is attempting to re-open the dialogue across the life sciences – as well as between the life sciences and the humanities – regarding what, precisely, such ineliminable terms as *representation*, *sign of*, and *meaning* might refer to in the context of living, interactive, complex adaptive systems” (Favareau 2005).

The goals of the project are thus easily stated: to investigate the organization and interaction of sign-processes in life processes – the *semiotic* in the *bio*. Indeed, that such sign processes exist, and exist ubiquitously, in biological organization is not in question. Biologists from across the spectrum of research – ranging from the investigation of the uni- and the multi- cellular to that of the systemic (immune system, brain), and from investigation on the level of the individual (organism) to the level of the social (colony, herd, or culture) – agree that sign processes both permeate the lives of creatures in the natural world. Understood in its broadest sense, ‘sign use’ makes possible not only such familiar higher-order human abilities as spoken language and written texts, but also underlies such communicative animal behavior as the calls and songs of birds and cetaceans; the pheromone trails of insect colony organization and interaction; the mating, territorial, and hierarchical display behavior in mammals; as well as the deceptive scents, textures, movements and coloration of a wide variety of symbiotically interacting insects, animals and plants.

Perhaps less obvious phenomena that are based on signifying (sign) relations are the chemoreceptive signals by which single celled animals negotiate their world (and upon which the human body's immune system operates); the chemical-electrical events that constitute the sensory messages and motoric signaling of the brain and central nervous system; and the DNA nucleotide sequences that, when decoded by cellular mechanisms, scaffold the construction of body form from the inanimate molecules of the genetic code. Yet all of these phenomena are examples of "sign use" – i.e., life-sustaining *substitution relations* whereby something is "re-presented" to an organism by something other than itself. Sign-use, seen thusly, pre-dates human *symbol* use (which is a very specialized and culturally-mediated development built upon the ubiquity of these more primitive sign processes) by millennia, and stands as one of the great 'organizing principles' of nature – for all organisms, from the single-celled amoeba up to us, must navigate the full causal effects of a world of externality to which they have only partial sensory access. That said, however, it is likewise obvious that the particulars of these sign processes differ from each other in a number of important and yet not always clearly delineated ways – ant trails are not neural pathways, T-cells are not thinking agents, and human symbolic language cannot be reduced to the iconic and indexical communication practices of songbirds, monkeys, or whales.

Up until very recently, however, no one discipline has dedicated itself to a synthetic investigation of how the processes of sign use and the processes of biology inter-relate for various organisms – and the ways in which such relations might differ across the spectrum of biological life. Drawing together researchers in neurobiology, anthropology, animal ethology, developmental systems theory and semiotics to investigate the close relation between living systems and their sign processes, this still-emerging discipline seeks to trace the evolutionary development of sign-mediated ways of being in the world from its beginnings in the transmission of information across single cells to its most complicated realization in the abstract forms of human thought.

What is biosemiotics *not*?

Today the interdisciplinary research project of biosemiotics is still very much a work-in-progress. Tracing its roots back to the multi-disciplinary conferences between biologists and semioticians convened in the 1980s by the Hungarian-American linguist and polymath Thomas A. Sebeok (1920-2001), who gave the current field its name, biosemiotics in the last ten years has blossomed into an international exchange of ideas between a wide variety of researchers who are actively studying any of the myriad forms of organismic sign use found throughout the natural and cultural world. And yet, despite the project having most recently come into its own with the establishment of its own peer-reviewed journal and annual international conference, I find that, all too frequently, one's first encounter with the word '*biosemiotics*' conjures up a network of misguided candidate meanings in the hearer, such that I must thus clarify at the outset of any discussion regarding this project, exactly what the contemporary research agenda of biosemiotics is *not*.

In brief: *Biosemiotics* is not *sociobiology*, for it rejects the simplistic equation of modern human symbolic practice with its naturally selected prehistoric forbearers. "Evolution, both physical and cultural," writes cultural anthropologist and biosemiotician Wendy Wheeler, "is a complexly

non-linear accumulative process, and its results cannot be satisfactorily explained by reduction to earlier stages” (2006: 22). Similarly, *biosemiotics* is neither a *bio-mechanistic* nor a *genetic-reductionist* approach towards organismic sign processing, such as may be found in, for example, the proposals of Churchland’s (1984) ‘eliminative materialism’ or in Dawkins’ (1976) concept of the ‘selfish gene.’ Rather, at a time when strictly materialist reductionist explanations of life and its evolution have become increasingly incompatible with what biologists are now conceding is the complex, adaptive and non-linear nature of organization and interaction in the natural world, the conceptual work now taking place under the aegis of the “biosemiotic perspective” (e.g., Barbieri 2007; Deacon 1997; Emmeche 2002; Hoffmeyer 1996, 2008; Kull 2003, 2005; Sebeok 1990, 2001) is grounded in the conviction that the *subjective experience* of organisms – non-linguistically articulable in all cases but our own (and even there, at only one particular level of our experience, as Aragno argues in her essay so eloquently) – is a genuine and irreducible determinant of organismic behavior in real-time interaction.

“Most of what happens between animals themselves or animals and their environment is triggered or carried by stimuli which, from a physico-chemical point of view, are negligible when set against the volume of matter and energy thus activated” writes molecular biologist and biosemiotician Jesper Hoffmeyer (1996:46). Hoffmeyer then goes on to give the example of a 100 pound dog who runs off at top speed at the detection of an odorant molecule. “While it may be possible to account for the dog’s muscle contractions biochemically, that still does not truly explain the phenomenon scientifically” writes Hoffmeyer, for what is ignored here is the obvious and scientifically investigatable fact that “the dog has received a message or a sign [e.g., that food or another dog is nearby]” (*ibid*). Hoffmeyer’s point is that, as an integral part of what biology sets out to investigate – i.e., the organization and interactions of living organisms in the world – this phenomenon of ‘receiving messages and signs’ must be studied not only on the level of the biochemistry that allows such mass and energy exchanges, but on the systemic level of the ‘meanings’ thus produced, and the placement of those ‘meanings’ within a larger network of agent-object interactions. Thus, in calling for the scientific study of signs *qua* signs (as an additional level of investigation separable from the study of their underlying physics), biosemiotics argues instead for the *necessarily constructivist* efficacy of agents’ actions, ‘understandings’ and decision-makings in structuring (and being recursively structured by) the elements of their material surround – a surround which, in nature as in human society, includes the actions of other agents, both historically and in real-time.

Finally, in averring the naturalist constructivism of interdependently situated and causally efficacious biological agents, however, biosemiotics is most decidedly *not* an appeal to a *non-scientific* explanation of phenomena of any kind. Rather, it is committed to an utterly natural and non-mysterian understanding of organisms’ relations of interaction and organization that is in full accord with the traditional findings and principles of science. It does *not* entail – and, in fact, it unequivocally rejects – any form of ‘disembodied metaphysic,’ ‘transcendent immaterialism,’ or ‘naïve anthropomorphism’ – much less any kind of anti-scientific or ‘supernatural’ (e.g. spiritual, vitalistic or animistic) attempts at understanding or explanation.

Unfortunately for the contemporary biosemiotician, however, the institutional Manichaeism dividing scientific study and semiotic study has resulted in a divide whereby physical and material processes fall into one side of a cosmology, and semiotic and immaterial process fall on

the other, and where the only possible relations between them being posited are those of ontological reduction, elimination, and incommensurability. Biosemiotics, of course, offers a fourth alternative to these understandings, as it “converges with several other strains of scholarship in an expanding intellectual universe ... transcending a dichotomous Cartesian, analytic view of the world, in the direction of a view embracing the whole, respecting complexity, and fostering synthesis.... [to] provide the human sciences with a context for reconceptualizing foundations and for moving along a path which, demonstrably, avoids crashing into the philosophical roadblock thrown up by forced choices between realism and idealism, as though this exclusive dichotomy were also exhaustive of the possibilities for interpreting experience” (Andersen et al. 1984:7).

Having thus set out, at least in overview form, the parameters of biosemiotic investigation and understanding,² I will next attempt to highlight some of the deep parallels between Aragno’s multi-leveled approach to the semiotics of the clinical situation and the kind of irreducibly triadic agent-object-meaning analysis that is at the heart of the biosemiotic project. I will do this in the context of my own earlier work on the neurosemiotics of intersubjectivity, as the theorizations suggested there about the experiential ‘emergence’ (as opposed to the epistemological ‘pre-given’-ness) of the concepts of ‘self’ and ‘other’ dovetail nicely with Aragno’s call for the cultivation of a deep “empathic attunement in psychoanalytic discourse [as] a way of reaching to the heart of the emotional sense of another’s experience, *beyond and beneath surface signifiers*, by resonating with its unreferenced, non-discursive, expressive and emotionally evocative elements” (*32).

The Necessity of Adding Sign Science to Life Science

Although the language of semiotics – ‘message’, ‘signal’, ‘sign of’, ‘interprets’, ‘communication’, ‘encoding’ and ‘representation’ – runs ineliminably throughout the many related disciplines comprising biology, or the study of life, in none of those sub-disciplines outside of the study of surface-level human or animal communication *per se*, is the language of ‘sign relations’ more ubiquitous than in the study of the nervous system and, most centrally, the brain. For the brain is where (to the best of our current understanding) the body’s endlessly generated signs, signals, messages and encodings representing both current external reality and internal body states come together to yield, first, the highly mediated product of incoming sense data that constitute perceptual *representation*; next, the systemic action-oriented interpretations that arise from incorporating the incoming perceptual representations within the brain’s currently constituted network of situated *meanings*, and finally, the linguistically-mediated experience that we call ‘*thought*.’

Now, while even the above ‘thumbnail description’ of the pathway that leads from the physical impact of matter and energy impinging upon the sensory receptors of the organism to the realization of linguistically constituted experience in the human being is a gross oversimplification by many magnitudes, the critical point for our discussion here is that the contemporary scientific investigation into what is most manifestly a complex chain (or web) of physical relations that are at the same time a chain (or web) of *signifying*, or ‘sign’ relations, is

² Those wishing a further introduction to the history and theory of biosemiotics may find fuller accounts in Emmeche 2002, Favareau 2007a, Kull 2003 and Sebeok 2001.

undertaken, for the most part, by individuals having no education in the study and logic of sign relations *per se*.

Rather, the multi-billion dollar project of neurobiological research is staffed all but entirely by molecular biologists and biochemists – and accordingly, our advances in understanding the molecular biology and biochemistry of neurobiological processes have been vast. But as Hoffmeyer’s example of the dog’s behavior above reminds us, however: even the most complete understanding of the underlying physical configuration of a signal will not, *in itself*, bring us to an explanation of how that configuration functions as a *sign of something other than itself* – as is always the case in neuronal activation, whether manifesting as immediate ‘sensation’, categorized ‘perception’ or abstract, conceptualized ‘thought.’ For that, one needs to incorporate the research findings of the biochemical investigations into brain activity with a scientifically productive and reality-based ‘general theory of *sign* relationships’ *per se* – one which is sufficiently general such that it can be effectively applied towards non-linguistic sign relations, as these are by far the majority kind of sign relationships found within the world of biological (i.e., living) systems.

For primarily historical reasons that I have written about extensively elsewhere (e.g., Favareau 2007a, 2007b, 2007c, 2008), the contemporary disconnect between sign research and brain research owes much to the modernist dichotomy wherein all ‘signs’ are conceived in terms of either mental, self-conscious, human-style phenomenological experience, or of human-style linguistic communication. And, indeed, if it is only by recourse to such latter-day evolutionary phenomena that one is deriving one’s whole conception of what a ‘sign relation’ fundamentally *is*, then such ‘sign’ relations certainly have no place in the examination of any other form of animal life, much less in the examination of neuronal activity, not any other kind of signal transduction between cells. Neuroscientists are right to reject the uselessness of attempting to apply higher-order human cultural phenomena to aid in their understandings on what is happening on the level of the cell. But they are wrong to neglect what a principled and biologically-informed theory of signs can do for the investigation of cognitive processes both within and external to the brain. For one of the many helpful clarifications that biosemiotics can offer cognitive neuroscience (or any of the cognitive sciences) is a principled way of understanding how and why ‘signs’ in their fundamental essence are manifestly *not* the kinds of human phenomena described above.

For such human phenomena as described above relies on our species-specific kind of ‘symbol’ use – and while ‘symbols’ are a species of higher-order signs (constructed out of putting lower-order signs into a particular relationship, as we shall see below), to conflate the definition of ‘sign’ with the definition of ‘symbol’ – and thus conclude that all signs must take the form of symbols, and that which does not take the form of a symbol is not a sign – would be (and has been) as disastrous for the scientific investigation of cognition as would be the equivalent conflation for taxonomy that, since all known human bipeds are most manifestly mammals, the exhaustive *definition* of what constitutes a ‘mammal’ must be ‘that which takes the form of a biped’. In both cases, we see what Terrence Deacon calls an “explanatory inversion of evolutionary cause-and-effect” (1997:53).

What I hope to very briefly show here, is that one of the many conceptual tools that biosemiotics can offer to cognitive science, then, is a principled set of distinctions for distinguishing the different kinds of sign relationships (so as not to conflate signs with symbols, for example) – one that, moreover, may better equip us to more productively approach the question of how symbols come from signs in the first place – i.e., how lower-order representation of external reality can give rise to successively higher-order representations, and how the recursive dynamism between levels (for the higher-order representations can and do, of course, come to inform – in the sense of biasing and constraining – the lower) gives rise, in turn, to a necessarily partial, but fundamentally *veridical* ‘knowing’ of external reality for all organisms (and, at least in humans, the symbolic self-consciousness of ‘knowing that one is in the act of knowing’).

Towards this end, many biosemioticians have found it profitable to study the extraordinarily detailed ‘logic of sign relations’ developed over the course of seven decades by the American scientist, logician and pragmatist philosopher Charles Sanders Peirce (1839-1914). Peirce’s *semiotic* (or sign-logic) considers the active *establishment* of sign relations between agents and their surrounds as the primordial basis of all cognition – from the evolutionarily-instantiated ‘knowing’ that is the reliable, world-tested, but non-mental repertoire of perception-action patterns guiding the successful actions of invertebrates to the self-conscious, linguistically articulated set of recursively laminated sign processes that has layered an emergent structure for the interpretation of experience that is not eliminatively reducible to its more primitive epistemic support. At the foundation of all such sign relations, claims Peirce, is the active *use* of one element of the physical world to signify something beyond itself for some agent (CP 2.228).³ For the majority of living agents, the ‘establishment’ of such sign relations takes place over the long course of natural evolution, with the resulting ‘seek and eat’ ‘fight or flight’ ‘mate and stop mating’ signals hard-wired in to the animal’s biology at birth.

Recognizing that such biological relations have *become* ‘innate’, however, should not blind us to the ineliminably semiotic nature of those relations – rather, it alerts us to their *necessarily* semiotic nature in organizing a living system’s ongoing adaptive coupling to its surround. Such historically evolved *lawfulness* is, “*par excellence*,” sais Peirce, “that which demands an explanation” (CP 6.612). At some point, the reception of (e.g., odorant molecule) *x* had to become reliably associated with the activation of motor response *y* in order for effective sensorimotor ‘couplings’ to evolve in organisms – and we must assume that the original *establishment* of these ‘sign relations’ – this bringing together of disparate phenomena, such that of *x* becomes a signal for *y* – is the result of none other than the costly but effective process of natural selection. Indeed, the fact that the exact same physical configuration, *x*, signals not *y*, but *z* – or perhaps nothing at all – for some other organism with a different evolutionary history, further reveals to us that even these ‘innate’ biological relations have become so over evolutionary time because of their *semiotic* value in allowing an organism to successfully negotiate and act upon its external environment. Thus, the property of *x* as ‘*information*’ for the organism lies *not* in the brute physical constitution of *x* itself, but in the way that the reception of *x* (itself an evolutionary semiotic product) becomes embedded within a network of action-oriented relations that *mediate*

³ Because the majority of the Peircean corpus exists only in unfinished manuscript form, the ‘CP: x.xx’ citation format is the standard practice adopted by Peirce scholars for referring to Peirce’s writings, as they have been collected in the eight volume *Collected Papers of Charles S. Peirce*. CP refers to this collection, and the numbers refer to volume and paragraph, respectively.

between the organism's currently existing biological state and the externally-existing contingencies of the outside world. Such *mediating* relations are by definition 'sign' relations, and their successful establishment, via natural selection, results in animal 'knowing' in its most primitive – yet fundamental – sense.

For as animal form ascends in complexity, we see the increasing capacity for animals to establish object-action sign relations within their own lifetime – ontogenetic 'learning', to be precise – in addition to the biological object-action relations that remain hard-wired into them by evolution. This evolutionary increase in 'semiotic freedom' reaches its current apotheosis in the human capacity for abstract thought, where even counterfactuality can be represented, communicated and semiotically manipulated. Such ability to engage in 'virtual' or 'off-line' acting upon the world requires – in addition to the corresponding increase in the physical 'possibility space' for object-action *mediating* ability afforded by the expansion of the brain (and in particular the 'uncommitted' neural circuitry of the pre-frontal cortex) – the realization, transmitted to us through our participation in human culture, that the 'signs' of our mentally-mediated experience *are* 'signs' and not the things that they are signs of in themselves.⁴

Peirce's Experiential Hierarchy of Sign Relations

A laboratory trained chemist, astronomer, mathematician and logician, Charles S. Peirce was also a tireless philosopher who left behind, at the time of his death, some 80,000 manuscript pages detailing his fifty years labor in working out what he called his 'semeiotic' – or logical theory of signs (Brent 1998). For most of the first half of the twentieth century, Peirce was most famous for his creation of the philosophical school of 'pragmatism' – an action-oriented epistemology that is based on the naturalistic cognitive principle that "we conceive our notion of *truth* in terms of what facilitates our commerce with experience" (Colapietro 1996:163).⁵ In the last few decades of the twentieth century, however, the growing interest in developing an evolutionarily coherent science of cognition has led to a revived interest in the 'architectonic of sign logic' that Peirce derived to support his naturalistic conception of knowledge, and the long-overdue publication of many of his previously unpublished manuscripts has proved to be a treasure-trove of conceptual tools for the scientific investigation of sign relations – the institution of which was Peirce's lifelong dream.

Indeed, one can hardly overestimate the theoretical richness of the Peirean corpus for the working cognitive scientist, philosopher, and anyone who is interested in the intersection of biology, culture and mind. For the psychoanalyst, in particular, Peirce's writings on inferential abduction, intentionality, belief-fixation, phaneroscopy (phenomenology), semiotic teleology, valuation, and hypostatic abstraction offer a wealth of insight into what Peirce calls 'the law of mind'.⁶ In the small space that I have available to me here, however, I will only have time to

⁴ The work of John Deely (particularly Deely 1990, 2001, 2002, 2007) is particularly valuable in its in-depth explication of this point.

⁵ Followers of Peirce such as his contemporaries William James and John Dewey (and later, George Herbert Mead and C.I. Lewis) would go on to develop the philosophy of 'pragmatism' in ways not always consistent with the realist yet communalist principles underlying Peirce's "theory concerning the proper method for determining the meaning of a conception" (Brent 1998:80).

⁶ The canonical source of Peirce's writings are the *Collected Papers of Charles S. Peirce*, published in eight volumes from 1931-1958, and running many thousands of pages. Notoriously ill-arranged, this is not the place to

discuss, cursorily, one small element of Peirce's massive logic of representation – the experientially nested hierarchy of iconic, indexical, and symbolic relations.⁷

A scientist by training and by temperament, Peirce strove for precision in his terminology, as well as in his logic. Indeed, it is in just this terminological precision in the delineation of sign relations, I will argue shortly, that his work holds the promise that we may one day be able to distinguish and to profitably investigate how the 'perceptual' neural activity in the brain gives rise to the 'associative' which, in turn, gives rise to the 'conceptual' in a way that has not yet even been attempted in contemporary neuroscience (where, for semiotic purposes, 'all action potentials look alike' – as, indeed, they do, if one looks at only their individual physical properties *in isolation* from the networks of agent-object-action *meanings* in which they are embedded). To do this, however, requires the learning of a technical terminology devised to capture the specificity of such inherently recursive relations in their *aspects* as 'percepts', 'associations' and 'concepts' *for* a given agent.

The relations that we will be examining here concern what Peirce considered to be "the most fundamental division of signs" (CP 2.275) into experiential *firstness*, *secondness* and *thirdness* – relations that he calls *iconic*, *indexical* and *symbolic*.

Taking these two Peircean trichotomies in turn (and, of course, simplifying greatly): For Peirce, 'sign' relations are a species of a larger genus of phenomenological relations whereby a possibility – a potentiality made immanent by the presently existing configuration of relations – becomes singularly actualized (*firstness*), resulting in its unavoidable interaction with the set of all such other presently realized actualities (*secondness*), so as to result in the dynamic mediation that is pattern (*thirdness*). And although the terminology might seem strange, it should be obvious upon careful consideration that there is nothing mysteriously "metaphysical" about Peirce's notions *firstness*, *secondness*, and *thirdness*.

Rather, these relations refer, in a radically fundamental sense, to the scientifically examinable (and scientifically necessary) relations that give rise to the generative and recursive emergence of *being*, *interaction* and *law*. All physical 'development' – "time's arrow" as it is often called – is nothing other than the *history* of successive, recursive change – as, at each point, possibilities are made available only as the result of immediately preceding interaction. As one of those possibilities is actualized (and all others not), a new and slightly changed set of possibilities and constraints come into being, becoming the substrate from which all next actuality must emerge. Such 'irreversibility' is characteristic of complex, adaptive systems such as the systems we call

begin one's study of the works of Peirce. Recognizing this, in 1992 and 1998, the scholars associated with project of re-ordering these papers today issued a two-volume set featuring some of the seminal portions of the *Collected Papers* entitled *The Essential Peirce*. The absolute best way to begin one's study of Peirce, however, is with an overview, and for this purpose, the following texts may be a particular value to psychoanalysts: T.L. Short's (2007) *Peirce's Theory of Signs*, H.S. Thayer's (1968) *Meaning and Action*, Gérard Deledalle's (2000) *Charles S. Peirce's Philosophy of Signs*, and Vincent Colapietro's (1989) *Peirce's Approach to the Self: A Semiotic Perspective on Human Subjectivity*.

⁷ For an extremely clear discussion of Peirce's icon, index and symbol distinction, there is no better place to begin than Terrence Deacon's (1997) *The Symbolic Species: The Co-Evolution of Language and the Brain*, particularly Parts One and Three. My own most recent attempts at 'making Peirce's ideas clear' to a general audience include Favareau 2007b and 2007c, with an additional focus on the human culture of symbolic reference in Favareau 2008.

‘organisms’, ‘brains’ and (on the psychological level) ‘personal identities’ – and much of what Peirce had to say about such relations presciently anticipated the work in dynamic systems theory and complexity science that is increasingly characterizing 21st century science, and in particular, biology (see especially Short 2007 and Favareau 2001 and 2002).

It is within the *phenomenological* possibility space of *firstness*, *secondness* and *thirdness*, claims Peirce, that any sentient organism’s establishment of ‘sign’ relations must by necessity take place.⁸ Not surprisingly, Peirce’s understanding of a ‘sign relation’ is a good deal more complex than the Saussurean human-language derived notion of arbitrarily concocted ‘signifier’ standing for a mentally conceived ‘signified.’ (Saussure 1916). Neither human mentation nor human language are pre-requisites for sign relations, insists Peirce – rather, they are manifestly the *product* of such relations. Accordingly, and as opposed to Saussure’s mentalistic and dyadic conception, Peirce proposes instead a functional and triadic conception of sign relations. For Peirce, any and every genuine ‘sign’ relation is *necessarily triadic* by definition – for what establishes a particular agent-object relation *as* a ‘sign relation’ is the fact that it is irreducibly *constituted* by the experiential interdependence of:

- 1) its *representamen* (that entity that, in everyday parlance, people colloquially refer to as ‘a sign’ [e.g., musical notation, spoken words, a traffic light] but that, in Peirce’s more precise terminology, denotes at most a ‘sign vehicle’)
- 2) its referential *object* (which can be either an entity existing in the external world or simply another node in the network of established meanings)
- 3) and its *interpretant* (the effect that reconstituting the system in which this relation takes place, such that the *representamen* can now function as ‘a sign of’ the *object*, has on the lawful operation of the system).

This thumbnail description of the Peircean ‘sign relation’ as presented above may at first seem abstract, but I hope to show presently how it can serve as a useful tool in better understanding cognition both on the linguistically expressable communicative level, as well as on the functional and organizational level of the brain. And while there are many additional deep implications of the Peircean ‘logic of sign relations’ for psychoanalysts and cognitive scientists to pursue, of particular relevance to our upcoming discussion of empathy and mirror-neuron research findings are the following entailments of Peirce’s definition of the necessary and sufficient conditions for the constitution of a ‘sign relation’ that appears above:

- (1) No entity in the world ‘has’ significance (or sign-hood) in itself as one of its ‘properties’; *significance* is, rather, the product of prior processes of ineliminably agent-object-action interactions;
- (2) The *object* of a given sign relation is always something ‘other’ than the *representamen* that becomes recruited to ‘stand for’ or ‘point toward’ it. *Alterity* per se, then, makes no sense without sign relations, for without sign relations, ‘all things are only what they are’ and nothing else or other.

⁸ For the purposes of the present discussion, we will be considering only ‘anthroposemiosis’ or the uniquely human use of signs. Application of Peircean sign theory to the perceptual and communicative, yet not humanly symbolic, lives of animals may be found in Deacon 1997, Deely 2002, Favareau 2007b, and Hoffmeyer 1996 and 2008.

(3) The genuine reconfiguration in the systems of relations – or *the systemic change in one's 'practical bearings'* that Peirce here calls the *interpretant* – constitutes the '*meaning*' of a given sign-relation for Peirce (CP 5.438).

Germane for that discussion, too, is Peirce's notion of the *interpretant* – the reconfiguration in a systems' internal set of relations that results in the alteration of its subsequent action possibilities, biases, and constraints. Anticipating by almost exactly one century the kind of dynamic systems thinking that is now becoming commonplace in science, Peirce's novel conception of this mediating node in an ongoing matrix of agent-object-action interactions is a radical re-focusing of the generation of meaning *away* from the Cartesian notion of the disembodied and autonomous *interpreter* and *towards* those very processes of embodied (and later, social) interactions that give rise to those collective entities that we reify as 'interpreters' to begin with.⁹

Thus, Peirce realized that in both biology and culture, the most likely product of the establishment of any given sign-relation is the establishment of another, even more fully developed sign relation – one that incorporates the relational information made available by its predecessor into a generative and knowledge-bearing semiotic 'web.' This notion should become clearer as we examine Peirce's 'nested experiential hierarchy' of *iconic, indexical, and symbolic* relations.¹⁰

A Nested Hierarchy of Iconic, Indexical, and Symbolic Sign Relations

Anticipating what has still yet to become apparent to many investigators in the cognitive sciences today, Peirce recognized that a genuine 'science of sign relations' that would be applicable to the investigation of human mentation as an evolutionary product of animal being-in-the world would require, at the minimum, a general 'big picture' way of distinguishing between the brute perceptual, the reliably associative, and the maximally flexible (or *virtual*) abilities of living organisms to detect, categorize, and act appropriately upon the world – and, in at least one possibly unique case (which is our own), to reason about such phenomena itself through the publicly shared semiotic prosthesis that is language. These abilities for the brute perception, reliable association, and virtual (or 'off-line') manipulation of external reality corresponding to the Peircean hierarchy of for the establishment of *iconic, indexical and symbolic* relations, respectively.

⁹ Peirce's understanding of the 'rational individual' as an *emergent* product of the ongoing processes of internal biological and external social interactions is expressed most eloquently by his notion of 'hypostatic abstraction' – the sign process whereby predicates can become treated as subjects, and "a formal operation can be conceived of as an *ens rationis* (being of reason) in its own right" (Colapietro 1993:200).

¹⁰ Peirce derived a 66-fold classification system of sign relations from the realizable combinations of the triadic relations inherent in any given sign relation – each of which, as shown before, is irreducibly constituted by its signifying *representamen*, its referential *object*, and its consequential *interpretant*. The Peircean trichotomy of *icon, index, and symbol* that we will be examining here concerns the three possible phenomenological relations that a *representamen* may stand in relation to its referential *object*. The remaining two trichotomies – i.e., of a sign relation's *object* to its *interpretant* and of its *interpretant* to a *representamen* – will not be discussed here.

The characteristic sign ‘types’ corresponding to each of the nested experiential relations of *firstness*, *secondness* and *thirdness* are referred to in Peirce’s semiotic logic as *icons*, *indexes*, and *symbols* – and it is the establishment of these sign-types and their relations to one another in an ever-generative and recursive experiential hierarchy that underlies the abilities of any living system to effectively: (1) detect and categorize the incoming signs of the external world through the establishment of *iconic relations* (2) set up the associative network of interpretants (responses) that will the organism to act appropriately upon the world, through the establishment of *indexical relations*, and (3) in at least one possibly unique case (which is our own), to reason about such necessarily sign-mediated phenomena itself through the publicly shared semiotic prosthesis of *symbolic relations* that is language.

In short, to the extent that the relation between a sign’s *representamen* and its referential *object* “partakes in the [form or] *character* of its object,” it is an *icon*; to the extent that a sign’s *representamen* is physically “and in its individual existence [consistently conjoined or] *connected* with its individual object,” it is an *index*; and to the extent that a sign’s *representamen* “will be interpreted as *denoting* the object, strictly in consequence of a *habit* [convention or law],” it is a *symbol* (CP 4.531). Thus, through the evolutionary (and sometimes ontogenetic) establishment of *iconic*, *indexical*, and *symbolic* agent-object-action relations to (1) veridically *perceive* the world through the registering of *signs of presence*; (2) effectively *interact* with the world through acting upon *signs of association*; and, in the human case if no other, (3) inductively and deductively reason about the world through the virtual manipulation of *signs of signs*.

Expanding upon this semiotic hierarchy only to the extent that we have space for here (but again, please see Deacon 1997 for an illuminating overview): Experientially, the ‘given’ or now-most-current state of affairs in the world is present to the perceiving agent *in its firstness* as an unlabeled “raw feel” (what others have termed its *qualia*). Such *iconicity* of experience is determined not only by the properties of external objects themselves, but by the way that such properties are mediated by the unique biology of the agent doing the perceiving (Llinas 2001, Deely 2001, von Uexküll 1934). Famously, the things of the world arrive to us unlabeled – and of all the things that any given unlabeled sensation ‘could be,’ the perceiving agent – contextualized, always, within the network of existing action possibilities and constraints made available at any given moment by its own biological organization as a set of previously established agent-object-action associations – ‘experiences’ that given sensation (or set of simultaneously arriving sensations) *as* the percept ‘*x*’ (e.g., the color red, hunger, a flower, etc). Such ‘primary percepts’ are *iconic* in that they are representative, or self-similar, to all and any tokens of their given type. Out of the plenum of incoming sensory experience, then, an agent’s *icons* constitute the basic ‘distinctions’ – and thus, the pre-verbally categorized ‘entities’ – with which its subjective world is populated.

In the external world, phenomena exist that are ‘consistently conjoined’ together (to invoke Hume’s famous description). So must it be, too, in ‘experience’ if an organism is to successfully negotiate the contingencies of the external world. Accordingly, the purely non-verbal joining together of perceptual icons *x* and *y* (e.g., smoke with fire, or scent *a* with food *b*) – such that *x* becomes a functional ‘sign of’ *y* for the organism – constitutes the most basic kind of *indexical relation* whereby all successful *associative* cognition is established. Both as ‘Pavlovian’ and

‘operant’ processes, and in both evolutionary and ontogenetic time, such associative processes are *biological* mappings in the first instance, but no less ‘semiotic’ ones because of that – for even the now-‘innate’ sensori-motor associations of ‘hardwired’ behavior first emerged only as the result of the agent-object perception-action interactions of natural selection. As such *indexical relations* are first individually established, and then later joined together with one another into increasingly complex networks allowing for the feedback-and-correction cycles of multi-sequenced behavior, the evolutionary setting up of functional *indexes*, then, constitutes Peirce’s *secondness*, or second-level ordering, of semiotic experience. It is thus the agent’s active ordering of the primary sign relations of *iconic* experience into higher-order sign relations of *indexical* experience with one another that forms the web of *meaningful* perception that enables an organism to veridically know about, and effectively act upon, the *relations* of the external world.

In using the word ‘knowing’ here, we do not mean the kind of linguistically-mediated self-conscious ‘knowing’ that we associate with human mental experience, however. For while the successful setting up of indexical relations between icons manifestly must rely upon the semiotic mapping of the regularities of relations obtaining in the external world (e.g., of causes to effects, and parts to wholes), it is both limited to and constrained by that ‘constant contiguity’ in the physical world also. For a purely indexical relation, established solely by such contiguity, will ultimately be extinguished when that contiguity no longer obtains. Only when such relations can be *themselves be represented as ‘relations’* – and thus embedded within an even higher-order logic – does the possibility of semiotic *thirdness*, or *symbolic relation*, emerge.

Accordingly, once not just the ‘sensations’ ‘perceptions’ and embodied ‘associations’ of *iconic* and *indexical* relations – but also the very relations between experiential elements *per se* (i.e., the *iconic relations* of a sensations to a perception, and the *indexical relation* of one perception to another perception) become representable *as signs* in their own right, then and only then can the malleable conventionality of *thirdness* becomes available to living organisms for the re-contextualization of both *firstness* and *secondness* (i.e., perception and association), into the higher-order sign logic that we refer to as self-regarding ‘consciousness’ or *symbolic understanding*.

The emergence of such symbolic understanding in human beings – and, in its fullest sense, *only* in human beings – alerts us to an often overlooked fact about this highest-order level of cognition, however. We have seen, for example, how every given sign-relation’s *interpretant* is a present-context-dependent and next- context-creating *response*, such that “each subsequent representation in the semiotic chain represents the *prior* object-sign relation, *taken itself* as a higher-level semiotic object” (Parmentier 1994:5). Why, then, do we not find other animals realizing that their semiotic relations *are* relations and moving up the nonomological matrix towards symbolic understanding and the ‘off-line’ manipulation of virtual reality via the flexible use of signs understood to be signs (e.g., spoken language, writing systems, arithmetic calculation, musical notation, architectural blueprints, etc.)?

Certainly, the neuroarchitecture of the human brain is a factor in making such higher-order experiential relations possible – but, as primatologist and developmental biologist Micheal Tomasello (1999) has pointed out, the neuroarchitecture of the human brain has remained

virtually unchanged since the appearance of anatomically modern humans 150,000 years ago – neurobiology alone, then, cannot account for the exponential cognitive development taking place in the final less than one percent of this time frame, as human beings emerged from their pre-literate hunter-gather way of being of only 10,000 years ago to the ‘hyper-reality’ of today. The key to this revolutionary increase in cognitive capacity, claims Terrence Deacon (1997), following Peirce, is the development of an increasingly public *culture* of symbolic reference.

For, as Peirce reminds us, the *thirdness* of *symbolic* relations, as opposed to the *firstness* of *iconicity* and the *secondness* of *indexicality*, is characterized by a *representamen* being interpreted as a ‘sign of’ its referential *object* owing to “*nothing other than* the very fact of there being a ... general effective rule that it *will* be so interpreted” (CP 8.191). The ‘rules’ that result in the ordering of *iconic* and *indexical* relations, we have seen, emerge from and cannot transcend the rules of physics and biology, as it is for the continuance the organism that these *sign-relations* mediating between its internal biology and the physical relations of the external world must be established in the first place. *Symbolic relations* are not so constrained, however, but are instead free, in a sense that *iconic* and *indexical* relations are not, to mediate not *just* the physical contingencies of actual existence, but *also* the ‘virtual’ contingencies of counterfactuality that become a realm of possible negotiation when one is manipulating not reality itself, but merely its representative placeholders, understood to be such.¹¹

The most clear-cut example of the establishment of such a ‘virtual reality’ space of interacting *symbolic* relations is the case of human language use – a action-oriented system of signs so understood to be signs that it serves as the foundation for the ability of abstract human thought. (Deely 2002, Schumann et al. 2006). Yet even this characteristically human, characteristically *symbolic*, referential matrix still – like all instances of semiosis – requires a community laboratory of real-world cause-and-effect wherein even the most ‘virtual’ semiotic posits can be tested for veracity and effectiveness – a public domain of interactively-constituted sign-exchange whereby functionally ‘symbolic’ meanings can be created, negotiated and, most importantly for human beings, co-operatively sustained.

Tomasello (1999) makes this point succinctly when he notes that the ability to dialectically “ratchet” semiotic representations by off-loading them publicly into the very environment in which the community lives “is the crucial step in the ontogeny of human social cognition” that allows successive members of the community “to culturally mediate their understanding of the world through ... the perspectives and understandings ... embodied in the material and symbolic artifacts created by other persons far removed in space and time” (1999: 92 -93).

Even more germane to our present discussion, however, is the fact that in learning to access, draw from and contribute back to this communally constructed, public matrix of knowledge bearing relations, the human agent’s subjective experience becomes ‘symbol-ized’ through and

¹¹ Issues relevant to the practice and theory of psychoanalysis, I believe, run throughout this explanatorily minimal, but in the present context, somewhat extended discussion of Peircean sign logic, but it is only from the desire to keep this discussion from becoming even more extended that I have deliberately refrained from pointing out these relevancies – secure, too, in the assumption that the psychoanalytically trained reader will be able to draw even more effective connections here than I. In the concluding section that follows, I will allow myself a few brief words to sketching out what I see as some of the major advantages of incorporating a biosemiotic perspective in psychoanalysis.

through (Favareau 2008). Iconic and indexical relations of perceptual awareness and associative anticipation, respectively, are still ever-presently at work in the individual – one could not independently live without them, much less ever have access to the higher-order symbolic relations that needs the veridicality of these lower-order relations for its ultimate epistemological grounding – but the human being’s sense of ‘internal consciousness’ – one’s ability to ‘experience one’s own experience’ as a linguistic description of events, using ‘words’ that, by necessity, have been “borrowed from the society outside” (Deacon 1997:452) – marks a radical change in the semiotic architecture of human cognition, as its repertoire of functional and life-directing ‘meanings’ are constructed not just intra-personally, but intra-personally and extra-personally, as well.

For again, it is primarily in the larger cultural world outside of our individual selves that certain conventionalized sign-relations ‘become’ *symbolic* coextensively through their *use as such* in the network of interlocking representations, actions, and consequences that together creates and maintains our human, which is to say, our symbol-based way-of-being in the world. This way of being does, indeed, characterize our form of cognition uniquely from all other species in that realization of such an emergent higher-order logic for the interpretation of experience, in turn, exerts a downwardly causal influence on the way that the lower-order sign relations that give rise to it are then consciously experienced. Thus, as the relations that give rise to immediate sensation and learned associative inference become themselves *representamen* embedded in a higher-order system of ideation, novel associations and previously impossible chains of inference (i.e., *new indexical relations*) become established, re-defining the relevance and meaning of the individual elements of perceptual experience (i.e., the underlying *iconic relations*) of which such associations are comprised.

Yet if there is anything that most truly characterizes the distinctive form of human cognitive experience, it is Terrence Deacon’s observation that once having climbed climb up the ladder of symbolic reference and reached the top, we imagine that the ladder that brought us there does not exist (1997: 453).¹² Indeed, the relations at that topmost level militate against this at almost every point. Language-based, symbolic knowing becomes transparent to us – it, and only it, is ‘knowing’ for all intents and purposes (under the commonplace, unexamined viewpoint that the Peircean logic of sign relations is arguing against), and thus we deem symbolic knowing the *ne plus ultra* standard for what any kind of *real* ‘knowing’ must be defined to be. Animals, then, despite having successfully functioned in, and adapted to, the ever-uncertain moment-to-moment contingencies of an external world for billions of years, can be thought to lack ‘true’ *knowing* in this sense – *true* ‘knowers’ are defined by the human standard instead: i.e., with reference creatures who can manifest their thoughts as kinds of word-arrangements ...and then self-consciously re-arrange those arrangements so as to ask themselves: “How do I know that what I think I know, I really know?” – while demanding that yet still more word-arrangements will satisfactorily answer this question for them, somehow.

¹² Such is the reasoning behind Descartes’ famous *cogito* – proceeding from the assured existence of our immaterial minds, we reason our way to the probable existence of our material bodies – but Descartes’ *cogito*, whatever else may be its value, is not a scientific hypothesis that can withstand empirical investigation. Yet its dogmatic insistence on separating the ‘mental’ and the ‘material’ realms of inquiry has persisted, counterproductively, to this day. (See Favareau 2007a, especially pp. 13-25 for a more in-depth discussion of this point)

As noted before, it is an inversion of evolutionary reality to set the ‘baseline’ for cognition at the absolutely topmost level of the Earth’s most recent and, in many ways, anomalous species. For all of the so-called ‘lower levels’ of world-knowing – i.e., the moment-to-moment establishment of iconic and indexical sign relations – manifest themselves endlessly in our biological, pre-conscious experience still. Thus, writes biosemiotician Floyd Merrell, the Peircean hierarchy of sign-mediated cognition is “as thoroughly sensation-based as it is inferential and conceptual. The combined iconic, indexical and symbolic relations that emerge from our interactions with the objects of experience (including [purely mind-dependant] symbolic objects) richly and sufficiently constitute our ‘knowledge’ of those objects (1996: 238). But it is almost entirely through the use of *symbolic* relations that we describe, explore, contemplate and attempt to comprehend the whole.

And of the countless ‘symbol-ized’ meanings structuring and informing human experience, one is of particular significance for the individual, and for the project that is psychoanalytic inquiry in general – this is the ‘self’ – locus of all incoming sign and meaning mediation, and experienced symbolically (and simultaneously) as both the “*subject* of my own experience” that is *I* and the “object of other people’s experience” that is *me*. It is to a consideration of this most multiply semiotically laminated phenomenon that we turn now.

Self, Other, and Empathy

‘Immediate experience’, we have seen, is the product of every biological system’s need to establish veridical *iconic* relations representative of the present contingencies of the outside world. ‘Associative learning’ is the product resulting from the trial-and-error of *indexical* action upon the world over evolutionary and ontogenetic time, based on the perceptions initially made available by iconic relations. ‘Symbolic understanding’ – especially in the human case, where such relations of *thirdness* now ground our characteristic way of experiencing ourselves – is the result of internalizing the communally established use of signs *as* signs as our primary method of together getting things done in the world. If this is so, then, unavoidably, the human brain must be in some way organized so as to be able to give rise to these three main levels of experiential reality.

I have argued elsewhere (Favareau 2001, 2002) for the necessity of approaching our study of brain activity within the broad Peircean framework of *firstness*, *secondness* and *thirdness* relations that enable us to experientially carve out of the sensory plenum of existence in the world, the life-sustaining elements of *quality* and *representation* (firstness; iconicity); to flexibly join these experiential elements into relations of reliable *association* and *anticipation* (secondness; indexicality); finally to be able to embed the previously accomplished representations into a yet higher-order system of meta-representation for the ‘off-line’ manipulation of relations in a ‘virtual’ possibility-space that is *symbolic reference* (thirdness) (CP 1.378).

An application of such sign logic to the research findings on mirror-neuron activation that is discussed in the target article on pages *25-27 may help us draw even more fruitful conclusions from the provocative results of those studies, opening up the way to a more semiotically *dynamic*

view of ‘self-hood’ that is at once *personal*, *intrapersonal* and *interpersonal* in its recursively generative establishment of *iconic*, *indexical* and *symbolic* sign relations.

Research findings regarding the unique activity of ‘mirror neurons’ since their discovery in macaque monkeys at the University of Parma in the late 1990s (e.g., Fadiga et al. 1995, Rizzolatti et al 1996, Gallese et al. 1996, Grezes et al 2003, Iacoboni et al 2005) are fairly well known in cognitive inquiry circles at this point – these neurons “respond both when the [subject] performs a particular goal-directed action, and when it observes another individual performing a similar action...the proposal [being] that the observation of an action leads to the activation of parts of the same cortical neural network that is active during its execution” in both monkeys and in humans, in whom compelling, if less direct, evidence for the existence of homologous mirror-neuron systems have been found (Gallese et al 2004: 396).

Speculation about the role of such an innate neuronal system linking observation with execution as part of our basic cognitive apparatus has animated recent discussion on human imitation, theory of mind, autism, empathy, and language origins (e.g., European Science Foundation Forum 2008). Such speculation has been so widespread, in fact, that Vittorio Gallese – one of the original Parma researchers and the author who has perhaps most deeply explored the implications of these finds for cognitive science (e.g. Gallese 2000, 2001, 2003, 2007; Gallese and Goldman 1998, Gallese and Lakoff 2005) – has been led to comment that “the posited importance of the discovery of mirror neurons for a better understanding of social cognition, together with a sort of mediatic overexposure and trivialization, have stirred resistance, criticism and even a sense of irritation in some quarters of the cognitive sciences” (Gallese 2008:13). Mirror neurons are not “magical neurons,” as Gallese, in all of his writings, goes to great lengths to make clear (*ibid*). Rather, his claim is that:

our capacity to understand others as intentional agents, far from being *exclusively* dependent upon mentalistic/linguistic abilities, is deeply grounded in the *relational* nature of our interactions with the world. According to this hypothesis, an implicit, prereflexive form of understanding of other individuals is based on the strong sense of identity binding us to them. We share with our conspecifics a multiplicity of states that include actions, sensations and emotions (Gallese 2003:171).

Such “prereflexive forms of understanding” are, of course, precisely the kinds of pre-verbal, biologically instantiated sign relations that we have been discussing at some length above – ones that provide the bottom-up experiential substrate for even higher-level sign-relation processing that will, in turn, exert a top-down structuring influence on the subjects increasingly mediated acts of interpretation, so as to ultimately result in the linguistically-mediated ‘reports’ of internal and external speech.

Such increasingly *multimodal* and *mediated* relations are, I believe, what the author of the target article is referring to when she speaks of our “primordial vocabulary, deeply embedded in limbic and sub-cortical areas” – an *experiential* vocabulary of *embodied meanings* that exist *prior* to the later development of conceptual, word-articulable ‘thoughts’ – giving rise, in recursive interaction with the rest of the multimodally developing cognitive system, to those higher-order

“conscious empathetic responses” that may then exert “top-down activation of emotion by appraisal and cognitive processing” (Aragno *25).

The interactively emergent constitution of this multimodal system *as a whole* is what Aragno (for psychoanalytic purposes), Gallese (for neurobiological purposes), and biosemiotics (for interdisciplinary purposes) is seeking to more fully understand and explain. “To trace the development of empathy from its phenomenologically unmediated form to its most consciously controlled” writes Aragno, “we have to understand its roots and ontogenetic source, and the semiotic and referential mediations according to which it becomes increasingly specialized within [particular] semantic fields... following a continuum that originates in undifferentiated, innate, forms and moves to increasingly differentiated and forms... [and taking into account] the mediating effects of semiotic and semantic reference [that] bifurcate ego functions into experiential and linguistic processes” (Aragno *14, *19).

Gallese’s and Aragno’s call, then, is for a understanding of meaningful cognitive experience that arises out of, but is not eliminatively reducible to, pre-verbal biological experience. As a biosemiotician, I want to suggest that the incorporation of a naturalistic bio-logic of *sign-objects*, *sign-interpretants* and *sign vehicles* into the provenance of neurobiology, such as is offered by biosemiotics, will allow research in the brain sciences to transcend the contemporary reductionist assumptions whereby living knowing ‘reduces to’ or is but an ‘epiphenomenon’ of electrochemical activity, and will allow, instead, a principled and scientifically examinable way of mapping the many and various mediating relations *connecting* the sign-exchange processes in the neural sphere with the sign-exchange processes in the cultural ‘semiosphere’.¹³

Such a fully-developed science of biological sign-relations is, of course, decades away from where we are today, if not further. But I believe that equipped even with the gross conceptual tools made available from our short discussion of Peircean *iconic*, *indexical* and *symbolic* sign logic presented above, we can begin to make a some preliminary headway on Aragno’s call for “an epigenetic conceptualization of human interactions [wherein] earlier modes of attunement continue to coexist with later forms, though highly abbreviated and subdued, creating multistratal phenomena operating at multiple levels simultaneously” (Aragno *18)

Referring to Gallese et al.’s mirror neuron findings, Aragno notes that “the human autonomic nervous system is genetically prepared to react in like fashion to affect-signals from other humans” (*22). In biosemiotic terms, this primordial biological experience of unlabeled agent-object interaction afforded by the ‘hard-wired’ firing of mirror neurons constitutes the (all but evolutionarily) unmediated *iconic* experience upon which all subsequently more sophisticated sign relations and cognitive realizations must, by necessity, be scaffolded upon.

“It is this automatic resonance-induction, implicating a global neurophysiological reaction-pattern and *not* ‘identification’ proper that originates the biological roots of empathy,” Aragno then goes on

¹³ The terms ‘semiosphere’ was coined by the Russian semiotician Yuri Lotman (1922-1993) and has been popularized since by the Danish biosemioticians Jesper Hoffmeyer (1996) who uses the term to refer to the realm of biological interaction concerned with “all forms of communication: sounds, smells, movements, colors, shapes, electrical fields, thermal radiation, waves of all kinds, chemical signals, touching, and so on” in their use as *signs* by living agents (1996:vii).

to note, observing that “it will be some time before the informational value of these emotional states is endowed with *associations* signifying specific meanings; and more time still before there is *sufficient differentiation* for a controlled, mediated response to replace automatically aroused feeling” (*22, *italics mine*). Here, too, we see a deep congruence between the Peircean notion of a nested hierarchy of sign relations, whereby the unmediated sensory experience of iconicity, or agent-object relations of *firstness*, becomes embedded in a real-world network of associative cause-and-effect (indexicality, or *secondness*) that, in time, gives rise to the lawful systemization of yet a higher-order interactive logic (symbolization, or *thirdness*) that then becomes the interpretative filter whereby subsequent relations of *firstness* and *secondness* can be symbolically understood – and communicated.

“Affective experiences are...perceptual experiences” writes Aragbo, citing Basch (1983: 116) “how much information they convey and how meaningful they become depends on what is done with them associatively” (Aragno *23) The *secondness*, or indexical relations within which iconic mirror neuron activations become meaningfully (though not yet linguistically embedded), Aragno astutely notes, include “the infant/caregiver dyad whereby an adult translates involuntary, automatic affect-expressions into meaningful communication” (*ibid*). Infants, notes Aragno:

look up at caretakers responding to them with vivid facial expressions and sounds accompanying actions. The *quality* of mutual mirroring in this dialectical process is the interactive soil through which is recorded both how we felt and how we perceive we were responded to. These interactive-units, together with mimicked facial expressions, are encoded in lasting sensorimotor traces. They set the stage for how we will experience our own feelings and how we will, or will not, attune to others’ emotional states (Aragno *23)

This setting up of the crucially important *indexical* relations of *ontogenetic* experience, scaffolded upon the innate biology that allows for the veridical representation of *iconic* experience, is particularly critical in the human case, both because of the initial ‘unreadiness’ of the infant brain (in comparison with the brains of most other species) for negotiating the life that will lay before it, and because the route to such eventual mastery is *via* the setting up of those indexical relations that will allow one to successfully enter and negotiate the world of *symbolic* relations that *constitutes* the effective human way-of-being in the world.

The entry into that symbolic world, we have seen, is primarily through *language* (Deacon 1997, Tomasello 1999, Parmetier 1994, Hoffmeyer 1996) – and mastery of this *ne plus ultra* system of sign use understood *as* sign use begins not with mastery of words and grammar, in the first instance, but with mastery of the situated back-and-forth of meaning-making interaction that, as Aragno points out above, characterizes early infant-caregiver interaction. Indeed, research into the biological co-ordination of body rhythms between newborn infants and their caretakers (Lester, Hoffman and Brazelton 1985, Bergman and Fahey 1999, Fogel and Branco 1997, Feldman et al. 1999) reveals that within weeks after birth (and thus many years prior to the adoption of any system of grammar, syntax or even meaning-bearing “content” lexemes) infants master the critically important auto- and inter- regulatory skill of coordinating their own breathing and other biological rhythms to the rhythms of the other people around them – and these people, in turn,

regulate their own physiological rhythm patterns to those of the infant (Feldman et al. 1996, Fogel and Branco 1997, Trevarthen 1993).

In this way, the orientation to subtle action patterns arising transiently between agents – *and* to the consequences of one’s *own* actions within the patterns (what Schore 2001 refers to as the ability for *contingent responsiveness*) – can itself become an emergent *structure* for *interpreting* experience, long before the capacity for “understanding or producing a single word, and before conceiving of the fact that objects and events in the world are named” (Schore 2001: 166). Too, such mutually achieved synchrony and co-regulated interpersonal coordination of body rhythms, wherein “both partners simultaneously adjust their attention and stimulation in response to their partner’s signals” (Feldman et al. 1996), may itself serve as the necessary substrate for participation in the fine tuned choreography of moment-to-moment linguistic (and non-linguistic) communicative interaction to occur.¹⁴

Through the gradual mastery of such interpersonal co-regulation, ‘verbal symbols’ that first appear to the infant as mere sounds (*icons*) made by their interlocutors *take on* their symbolic character *first* as the result of their multiplyingly *indexical* real-world consequences in an ever-expanding system of joint interaction. It is in this way that cognitive scientist Robert Clowes (2007), building upon the work of biosemiotician Stephen Cowley (2007a), argues that “we can schematise the three stages of [semiotic] reorganisation that a child must go through as it internalises symbols” as follows:

1. Completing a symbolically initiated action
2. Stabilising activity with symbols
3. Establishing activity regulation with symbols (Clowes 2007: 114)

Clowes’ developmental hierarchy of symbol use, like Peirce’s experiential hierarchy, reminds us that – for all its ability to abstract and counterfactualize – *symbol* use is, first and foremost, a way of getting things done in the world. For from the mathematical calculations that allow human beings to send probes to far-off planets with pinpoint accuracy and to develop drugs that can effectively inhibit receptors on a cell membrane that no one has ever actually seen, to the experience of imaginatively manipulating counterfactual scenarios such as the events that will take place after one’s own death and the transparent – but exceedingly complex – phenomenon of ‘idea transmission’ that is taking place at this very moment as you read the lifeless marks on this page, the species-specific culture of human symbol use is predicated on the higher-order, *thirdness* understanding that the sign relation processes that we are using to know the world *are* sign relation processes, and not an unmediated engagement with externality itself – *and* that the *use* of such self-regarding sign relations to organize one’s actions makes their efficacy in the world of externality *more* reliably successful and consequential, and not less so (as the few examples noted above will testify).

¹⁴ Four decades worth of empirical research findings from the discipline of Conversation Analysis (e.g., Sacks 1995; Schegloff 1982, 1986, 1997, 2007; Goodwin 1980, 1981, 2000, 2002; Heritage 1984; Goodwin and Heritage 1990; Prevignano and Thibault 2003) robustly suggests suggest that ‘language’ as it is actually realized in naturally occurring, real-time, everyday talk-in-interaction, may derive its semiotic efficacy more from the active co-participation of situated speakers in creating contexts of relevancy, constraint and possibility for each other’s immediate next re-shaping of the interactional surround than it does from the computational recombination of referential tokens within the bounds of some predetermined, category-structuring syntax. (For a review of this work from a biosemiotic perspective, see Favareau 2008)

This is a realization that occurs gradually – and *experientially* (i.e., not linguistically or mentalistically) – in the first nine to eighteen months of life, manifesting as a full-blown ‘theory of mind’ when the child is approximately 3-4 years old (Baron-Cohen 1991, Gergely et al. 1995, Meltzoff and Moore 1999, Tomasello 1999). “Indeed,” claims psychologist Stephen Cowley “before *hearing* vocalizations as ‘words’, infants come to *use* utterances in self-serving ways. [Later, and as the result of the continuing success of this practice] they adopt *the language stance* of a ‘first person phenomenology’ and a narrative self” (2007b: 1). Cowley then adds, somewhat amusingly but very germane to our purposes here, that still later, if such children grow up to become unreflexive theorists, “they accept the fiction that mastery of language depends – not on activity – but on a naked brain (or mind)” (*ibid*).

Aragno, in her target article, also makes this point succinctly: “not all symbols are linguistic,” she writes, “however, those leading specifically to conscious awareness are necessarily linguistic (*21). Here, again, we see the tendency of a higher-order sign logic adopted by an organism to recontextualize its lower-order experience of learned and incoming (i.e., *indexical* and *iconic*) signs. “The interpolation in human experience of any semiotic process,” writes Aragno, “increases its complexity, radically transforming that experience by adding representational, referential, and conceptual dimensions. This radically *alters its functional constitution*, meaning that later versions of earlier forms are different in *kind* as well as in functional form” (*18). The goal of the practicing psychoanalyst, like that of the cognitive scientist, now becomes the task of effectively differentiating the levels on which a given instance of sign behavior occurs, and of understanding both the context of the existing the relations that gave rise to it, as well as the higher-order relations that it subsequently informs.

Equipped now with a biosemiotic understanding that allows us to see the naïveté of *equating* biological individuality as being co-terminus with the presence of an inborn symbolic ‘self’, we can now see more clearly how the mirror neuron research data demonstrates that not only the acquisition of symbolic language, but also and perhaps more fundamentally, the putting into indexical relations the brute icons of observed and executed actions, constitutes a *public* domain of ‘meaning’ upon which, and out of which, the ‘subject self’ is at least partially constructed. And this, in turn, shows us that there is no fully cognized ‘*self*’ to speak of that does *not* take the actions of others as the fabric from which itself is weaved.

Summarizing here what I have argued in more depth elsewhere (Favareau 2001 and 2002): ‘*Self*’ and ‘*other*’, are thus not best understood, in their foundational essence, as higher-order orientations which *converge upon* the organizationally primitive and biosemiotically prior iconic sign activity generated by the mirror neuron system – rather, they are but two of the results, products and ‘proper signicate sign effects’ (CP 5.473) which ultimately *emerge from* it, as multiply laminated sign relations that dialectically construe each other. And thus the argument is made from a biosemiotic standpoint that the most significant contribution of the mirror neuron system to human cognition lies *not* in the higher-order, innately dualistic, orientation that representation is mutual *between* agents – e.g., the symbolically reasoned-to conclusion that: “my representation of *x* and your representation of *x* occur similarly in both of us, therefore you and I are similar” – but, rather, in the inherently biological orientation that ‘inter-subjectivity’ itself is an *iconic* property of representational experience *within* agents – one’s existential and

iconic experience of x is mutual to both one's later higher-order experience of 'oneself' and to one's later higher-order experience of the 'other'.

Empathy and self-understanding are thus deeply, inextricably, biologically bound. And in this we might reflect at last that in our capacity as sign-using creatures, we don't primarily reason *to* 'empathetic intersubjectivity' – but rather (as the history of our species all too often attests) – higher-order symbolic 'reason' may be one of the strategies by which we move *away* from it. Indeed, it is for this reason that Peirce – a consummate scientist and logician – reminds us that to maintain that "I am altogether myself and not at all you" constitutes a 'metaphysics of wickedness' (CP 7.570) and that that "neither selves nor neighborselves [are] anything more than mere vicinities"(CP 4.69). 'Others' are in a sense *in* us and in our actions from the start.

Conclusion

There are, as science has realized for quite some time now, biological relations at the heart of our experiential being. What is only now becoming more apparent to scientists, however, is the interdependent set of facts that these relations: (1) have themselves have arisen through evolutionary histories of agent-object interaction, (2) are individually shaped by ontogenetic trajectories of learning, and (3) are, for human beings, inextricably embedded in a culturally-mediated way-of-being that makes their 'raw' moment-to-moment immediacy all but unrecognizable to us. Recognizing the multimodal and multidirectional character of these relations and attempting a scientifically responsible delineation of their characteristic forms and interactions is the first step towards the long and just-beginning "exploration of the as-yet uncharted continents of meaning" in the human brain and mind that is the ultimate goal of the still nascent interdisciplinary of *biosemiotics* (Barbieri 2007: 112). Ideas for the practice and theory of psychoanalysis such those proposed by Anna Aragno in the target article are well congruent with this undertaking, as her text displays her keen awareness of the multiple and simultaneous levels of sign-processing taking place in the life of an individual at any given moment.

Defining the "vast range of the unconscious" as comprising "the full continuum of experiences – from organic sensations, representational images and raw emotions, to verbal expressions, metaphors, enactments, dynamics ... that are verbalized and interpreted in the clinical situation" (*5), Aragno insightfully suggests that, for psychoanalysts, learning to "...resonate with [such] *sub-linguistic interactive modes* is also a way of establishing a mutually interpenetrative dialectical nexus at the core of this psychical field" (*32). And although she states in the target article that such an approach has been apparently dismissed in some quarters of psychoanalytic inquiry (*13), the development of a more semiotically-informed cognitive science, I predict, will prove Aragno to be correct: there is nothing 'mystical' or anti-scientific in recognizing that the creation and sustainment of meanings, dispositions, perspectives and responses takes place on non-linguistic (i.e., *iconic* and *indexical*) planes of biological experience that 'feed into' the higher-order *symbolic* articulations of language, both interpersonal and intrapersonal. Arguing the reverse, I would posit, would constitute a kind of 'idealistic reductionism' that is every bit as insufficient for understanding human psychological experience as the corresponding 'materialist reductionism' would be – for it is only by putting together what we know about both material and ideational relations can we hope for a non-impooverished understanding of the material-ideational product that is 'mind'.

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