Life in Mind

Commentary on Evan Thompson's *Mind in Life: Biology, Phenomenology, and the Sciences of Mind*

Psyche symposium

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I found Thompson's recasting of the sciences and philosophy of mind to be timely, wide-ranging, and accessible, as audacious as it is meticulous. The author repeatedly confronts the Cartesian split between mind and body, as it appears in various guises, in various literatures. Each time he works through it by integrating methods and findings from more sources than cognitive science or, I take it, phenomenology typically draws on. Along the way, he takes on mental representations, as well as several favored debating props of philosophers of mind, including creepy zombies and naked brains in vats, exposing their frequently odd assumptions and persuasively pressing his enactive alternative. At each explanatory gap he highlights the interdependence between insides and outsides, stressing immersion and intimate engagement: in stark contrast to much of the current literature, these are *living*, *embodied* minds open to their worlds.

In short, I am impressed.

I am also something of an interested party. First, of course, as a member of an intellectual community that benefits from judicious logjam-busting and well-wrought critique. Other commentators will surely address Thompson's accomplishments on these fronts, and will assess his overall contributions to phenomenology and philosophy of mind. My own remarks will be rather more narrowly focused, on his utilization of the tradition in which I work, Developmental Systems Theory, or *DST*. My specific interests are in the ways in which kindred intellectual traditions can be brought into conjunction.

In DST, the effort has been to elaborate a nondichotomous, systems-based account of development and evolution, while Thompson aims to demonstrate the continuity of mind and life. These are related goals, and the general affinity between the two perspectives has long been evident. Both rely, for instance, on self-organization and emergent forms rather than trying to explain complexity by prime causes and preformation; they share a mistrust of representationism (whether mental or genetic). Both emphasize concrete embodiment and temporality rather than abstract information-processing, as well as the interdependence between living entities and their surrounds.

And yet they descend from different conceptual forebears, have faced different challenges, and have developed different tools and tactics. Having been engaged in an ongoing conversation with proponents of autopoiesis/

enaction over the years, and having had my moments of uncertainty, I welcome this opportunity to join our author in revisiting these issues.

Articulating Autopoiesis with DST

Not long ago I wrote a short piece (2009b) on some aspects of inter- and intra-theory connections, distinguishing between “friends” and “neighbors.” These were not separate groups, but kinds of relations. The former are cited for documentation or support, and are often friends in the sense of being *enemies of my enemy*. As such they can be mustered for limited duty against a common opponent. More often than not this is done despite substantial lack of agreement on many other matters: the concordance bar is fairly low. With “neighbors,” on the other hand, the bar is set higher. The focus is now on the precise relations between conceptual systems and styles, the lexicons, beliefs and habits that allow scholars to work comfortably beside each other, to share tools and chores, perhaps even to set up housekeeping together. Away from the polemical frays in which potential conflicts can be ignored in the interests of solidarity, I suggested, we face questions about degrees and kinds of agreement: “What are our sticking points, and are they resolvable or terminal? How important is it to work through our various disagreements? Do early commitments preclude our being any more than theoretical neighbors, harboring similar complaints and irritations but kept apart by our histories, differences of academic culture and other impediments to mutual integration?” (Oyama,

2009b, p. 148).

In *Mind in Life*, Thompson periodically draws on DST arguments, especially in his Chapter 7, on development and evolution. Given our considerable common ground, we are certainly *friends* in the above sense. He seems to go beyond recognizing those overlaps, however, when he says he considers the theories of autopoiesis and DST to be complementary: the former, he says, gives an account of the internal dynamics of self-producing living beings and the latter, their coupling with their environments (p. 193). To me, complementarity implies something more than general kinship and ready citability, and it is these more finely articulated relations that take my interest here.

How closely do these two approaches match up on the issues of boundaries, levels, causality, and control that have been so important to them both? Do significant mismatches limit the fruitfulness of their theoretical engagement? These are not necessarily matters that needed to be treated in a book that already takes on so much, but perhaps they bear some consideration now. My intent, then, is not to hedge my endorsement of Thompson's book, but to explore the kinds of ties that can be forged between scholarly enterprises that have their own complicated backstories.

To begin with, I have virtually no argument with the points Thompson supports with developmental systems references, whether with respect to genocentrism in developmental and evolutionary biology, nature-culture

dualisms, or infotalk in biology and cognitive science. Something like the enactive approach seems just what is needed in the study of the mind. In addition, I was particularly struck (and gratified) by his deployment of my developmental-systems reformulation of *nature* and *nurture* (Oyama, 2000b). I have called them the *product* and *process* of ontogeny, thus removing the possibility of treating them as contrasting terms. In like manner, Thompson proposes dismantling the opposition between self-organization and natural selection in evolution: these, too, he asserts, can be seen, not as opposing forces, but as process and product to each other (p. 216). This seems to me both perspicacious and timely. While it will presumably be detailed and amplified, its immediate effect is to undermine the prevailing tendency to treat selection as a designing or shaping agent, an external force that can only be "constrained" by internal self-organization. At the same time, the move keeps faith with the thoroughgoing systems orientation of the book as a whole. Using a notion of complexity as "neither random nor ordered and predictable . . . exhibiting changing and unstable patterns" (p. 40) for instance, pushes back against the unhelpful but ubiquitous insistence on depicting evolution as a combination of chance and necessity (see also Oyama, 2009a).

My lingering hesitation, then, is less about the use Thompson has made of DST in this work than the precise articulations between the autopoietic and developmental systems that are so crucial to his arguments.

Presumably we're not just "saying the same thing," for our aims are not identical, but I'm hoping for enough intertranslatability (or at least reciprocal comprehension) at the borders that we can engage in worthwihile trade across them, for near neighbors we certainly are.

These matters may fall beyond the concerns of most readers, but I hope that my discussion will offer something even to those not seeking this kind of close-up scrutiny: not only do such negotiations go on all the time, among and within academic traditions, but they can be part of an individual scholar's ratiocinations as well: aspects of the process of intellectual evaluation and integration. It seems to me that Thompson's claim of complementarity implies a fairly full working-out of the sorts of questions mentioned earler. His footnote (note 15, p. 458) to my past worries about internalism suggests that he has resolved them to his satisfaction. If so, I'm in luck, for I could use a little help in working out the details.

Worries over Internalism

In the context of DST's critique of the widespread privileging of internal causes (typically innateness, "the physical", or DNA) over external ones (the environment, learning, culture, etc.), a certain kind of emphasis on interiors raises red flags. The privileging that worries DSTers often involves attributing asymmetrical causal roles to internal and external factors. Thus one kind of cause might be said to bear information or basic form, to control or determine some process, or to specify its possible outcomes,

leaving the other class of causes to modulate or interfere with those outcomes, or to select from a preexisting array of potential ones. Thompson has been alert to this issue, and remarks explicitly on it, providing us an entry point. In his footnote 15 he avers that his presentation is innocent of the kind of internalism that has concerned me (Oyama, 2000a, b).

Indeed, Thompson describes “the dynamic co-emergence of interiority and exteriority” (p. 79) pointing out (p. 118) that “autopoiesis always has to be ecologically embedded. ‘Self-producing’ refers to the kind of circular organization that makes the cell an individual; it does not mean that the cell makes itself apart from its environment.” He starts, in fact, not from the traditional mind trapped in the head, but from a radically open, embodied one. “Thus bodily feelings are not self-enclosed” (p. 23). Living interiority ”comprises the self-production of an inside that specifies an outside to which that inside is constitutively and normatively related” (p. 225).

I take one of Thompson’s main points to be that the enclosed privacy of the brain-locked mind is part of a Cartesian legacy that must be superseded. His decision (p. 235) to start from “lived body” is pivotal, signalling his departure from much of orthodox cognitive science. This openness extends to subjectivity (p. 36): “Generative phenomenology brings to the fore the intersubjective, social, and cultural aspects of our radical embodiment. . . . Individual subjectivity is . . . intersubjectivity,

originally engaged with and altered by others in specific geological and cultural environments."

This all seems right to me, and important. Yet, having described the mutual generation of insides and outsides, he says (p. 79, quoting Varela) that there still appears to be an asymmetry, "for it is the internal self-production process that controls or regulates the system's interaction with the outside environment." On the same page is a reference to the ontological priority of insides, based in part on the control of interactions by those insides.

The isolation that Thompson rejects is part of the complex I'm calling *internalism*, but the causal asymmetry sketched above is another, perhaps slipperier one. There may be intensive commerce with the outside, but what controls it? Thompson says (p. 370), "according to the enactive approach, sensorimotor processes modulate, but do not determine, an ongoing endogenous activity." Interiors have a special say about their commerce with the outside. Someone with DSTish sensitivities pauses, wondering whether, if we shift our view, the outside can similarly be said to "determine" that activity, while internal factors only modulate (and just what *determine* means). It is distributed causality and joint control that such a person sees, so the natural question is whether the openness and embeddedness Thompson describes goes with something like DST's view of system causality, only with different terminology. Our hyperalert reader

might point out that the reasoning used to say that the inside "controls" an interaction or "determines" or "specifies" an effect can just as well be applied to the external influence, which, if it has any effect at all (as it presumably must, or why call it an influence?), "controls" the interaction as well. Indeed, what is deemed a control is to a nontrivial extent a function of what comparison is being made, and therefore what is being bracketed or taken for granted. Given *this inside*, the outside "determines" the outcome; given *this outside*, the outcome is "determined" by the inside. But in the end the phenomenon itself is controlled systemically. Not all contributions to an interaction are of the same kind, and a metabolizing, responsive organism or cell has different interactive possibilities than a stone, but for DST the outcome of any interaction is the product of a host of factors, very few of which are typically attended to but whose causal contributions can be made evident and are part of a richer story.

Pragmatic Shifting and Kinds of Systems

Now Thompson's point has to do, not with just any old insides, but primarily with the interiors of living beings actively regulating and maintaining their boundaries. Such boundary-making and –keeping activities—such *insides*--are what autopoiesis was born to describe. A distinction (p. 43), futhermore, between self-governed systems and other-governed ones (*autonomous* and *heteronomous*, though perhaps not always under the same labels) has long been part of the autopoiesis literature (Varela,

1979). The autonomous ones have the qualities alluded to in the last paragraph, of internal regulation and endogenous control of interactions with the exterior, while the others are seen from the outside, as it were, as information-controlled, input-output mechanisms. This distinction is introduced by Thompson to contrast the enactive approach with traditional cognitivism. It seems that viewing the mind as a heteronomous system is a matter of "interpretive stance," a felicitous phrase I take from his Note 22 to Chapter 7 (p. 460), and that implies that the distinction is a matter of

attitude rather than "the thing itself being interpreted." This would be consistent with the pragmatic cast of both theories. Significantly, for Thompson (p. 39), the observer is present in the very definition of a system, a "collection of related entites or processes that stands out from a background as a single whole, as some observer sees and conceptualizes things."

That Note 22 about interpretive stances is about the possibility of treating an organism not as an autonomous system, but as a *designed object*, ripe for the reverse engineering so dear to the heart of the evolutionary adaptationist. I was initially bewildered by the idea of treating entities *either* (or even alternately) as autonomous or as heteronomous, for in DST internal and external factors tend to be noted at the same time, to counteract the privileging of factors on one side of a boundary (and then only some of those factors). It is useful, for instance, to underscore the

embeddedness of “internal” processes in a developmental environment that is no mere support or modifier of features already specified from the inside, but that is part of the very dynamics of maintenance and change.

The ambit of a developmental system thus extends beyond the focal entity itself. Yet by including developmentally relevant aspects of its surroundings, the system does not thereby exclude its internal relations. For me, living beings’ “coupling with their environments” *is part of* their “internal dynamics of self-producing.” So I wondered how well a developmental system could fill the role of explicating organism-environment coupling *as complementary to* autopoiesis’ view from the inside. Would the organism then be a heteronomous system “defined by input-output information flow and external mechanisms of control” (p. 43)? If not, are other characterizations available in the autopoietic framework besides the autonomous and heteronomous? If an autonomous system is coupled to an environment and/or another organism in the mutually-influencing manner described by theorists of autopoiesis and developmental systems alike, is each heteronomous when viewed from the vantage point of the other? If “the state changes of an autonomous system result from its operational closure and structural coupling,” furthermore (which has a DSTish joint-determination sound to it), how does this square with the declaration (p. 182) that it is the autopoietic network ”in its entirety that specifies the phenotypic characteristics of a cell"?

Autonomy and heteronomy, according to Thompson (pp. 49-50), are

"heuristic notions," subject to choice and context. Crucially for the present inquiry, he says (p. 51, citing Varela) that a shift to the heteronomous perspective is simultaneously a shift *up*—to a "larger system of organism-plus-environment." It is not, then, simply a movement between views at the same level, like alternating percepts of an ambiguous figure. Is that larger system, then, what I'm calling a developmental system? Must it, in turn, be an autonomous one?

Much of the play here seems to be in the meanings of internality and externality, as well as the notion of causal symmetry. It has been suggested to me (by Gregory Mengel, personal communication, June 25-26, 2009) that Thompson's internal-external distinctions are less about spatial boundaries (which is how I have tended to read them) than about selfhood, organizational closure, and the context-dependence of causes. In just this issue of boundaries, in fact, he finds what he terms a "fruitful tension" between the two theoretical traditions. This may be right. It would be consistent with what I said at the beginning of this commentary about our different pathways, and I return to this matter at the end.

Before moving on, I'll mention several related issues of enclosure and extent. If, as Thompson (p. 206) says, the "unit of evolution" is the developmental system, which he describes as a "milieu-embedded, propagative unit," is the developmental system the unit that is embedded in a milieu, or is the (relevant) milieu part of the developmental system? On such matters Thompson (e.g., p. 106) can be quite unflappable; he neither

demands nor offers premature certainty. Arguably more readily flapped than he, I don't demand immediate closure either, but do wonder whether any of these questions needs to be addressed, and what, if anything, hangs on them.

Here is a last question. Thompson emphasizes ontogenetic emergence, on occasion noting (pp. 380-382) when other theorists have neglected development. Could there be any point at which the developmental transformations that captivate DST exert pressure on the idea of the self-sustaining, self-stabilizing dynamics of an autopoietic system?

Arrested by these and other uncertainties, I go back to Thompson's (p. 51) caveat that "there is no inconsistency between characterizing the nervous system and organism as autonomous and emphasizing their somatic and environmental embeddedness. We do, however, have to keep our logical and conceptual accounts clear, so that we know which explanatory heuristic is in play at any given time." I admit that I did not fully assimilate that point about heteronomy entailing a move to a larger, inclusive system and so did not keep it in mind as I moved through the book. And as suggested above, I may have been giving his discussions of internal and external relations an excessively concrete, spatial reading. As it is, I suspect the residual distance between us is neither large nor consequential for most purposes. Certainly these bobbles in the rhythm of reading were minor in comparison with the pleasures of following Thompson's deeply informed analyses and seeing him show how notions

of circular causality, embodiment and embeddedness play out in cognitive science.

Inter-system Relations and Lineage Histories

The present commentary, then, is the reverse of many I've written. Too often I've wrestled with pieces that said many of the "right" things but that were, from my point of view, misguided, even benighted. With *Mind in Life*, by contrast, I am in such sympathy with the general enterprise and so much in agreement with many aspects of the analysis that my efforts are instead directed at dispelling some of my own uncertainties about our apparent convergences and divergences (and so perhaps doing the same for others); increasing the mutual usability of our respective stores of concepts and terms; provoking reflection on the adequacy/suitability of those stores for the discourses we now face and may in the future; and last, raising a question I broached in my piece on theoretical friends and neighbors (Oyama, 2009b), where I compared the two traditions. There I speculated that as compatible as they are in many ways, the theories of autopoiesis and developmental systems may be destined to remain near neighbors, not because of any fundamental incompatibility, but simply because we started from different points, in somewhat different circumstances, engaging disparate problems.

Rather than seeking to define life and identity, like the theorists of

autopoiesis (and later, with the enaction perspective, to explore experience), I had begun with development. They found asymmetrical relationships across system boundaries indispensable to their accounts of self-making and self-maintaining, whereas I, struck by how often problematic nature-nurture distinctions were buttressed by asymmetrical language, stressed the importance of treating causal factors on both sides of those boundaries in the same way (and, if it was called for, at the same time): treating them symmetrically *as causes*. I am not able to say whether such symmetry in DST is the practical equivalent of the switch between autonomous and heteronomous views of a system (this is why I pose the question here)--whether alternating views are effectively the same as simultaneous ones. As noted earlier, it may well be that the internal and the external carry different meanings in the two literatures. It is fairly clear to me, though, that for one set of workers the integrity of boundaries was paramount, while for the other, it was their permeability. Yet, to talk about developmental interactions across a semipermeable membrane, say, there must be a focal entity in the first place. It is the nature of that entity itself that Thompson and his cohorts address. And in the end there need be no contradiction between integrity and openness, which may be simply to restate Thompson's remark several paragraphs back, about autonomy and embeddedness.

If the two traditions are separated by a kind of sensitive dependence on initial conditions, by these prior choices of battles and implements, and by

the entrenchment of certain styles of expression, it is an open question whether that separation can be reduced. It may even, as Mengel ventures, itself be the kind of fertile gap that spurs productive probing and exchange. What seems quite certain is that our associations are sufficiently close that we can enjoy the mutually enriching cooperation and understanding that characterizes the best of neighbors.

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