parrhesia 24 · 2015 · 233-56

being-in-the-world, temporality and autopoiesis[1]

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Encounters between phenomenology and cognitive science are nowadays no longer a novelty. The decades that have passed since Hubert L. Dreyfus told MIT researchers that they could learn something by reading *Being and Time* have seen the rise of a flourishing discourse that has become greater than the sum of its parts. Recent times have seen what began as a primarily critical interaction, with various authors (including Dreyfus himself) drawing upon phenomenological accounts to reject computational models of the mind and the quest for what Haugeland called 'Good Old-Fashioned Artificial Intelligence', develop into a more constructive, positive discourse that seeks to unite the disciplines in mutually-enriching research projects.[2] Various streams within the contemporary study and philosophy of cognition draw upon the resources of the phenomenological tradition to anchor, substantiate or flesh out their accounts of cognition as always-already situated and purposive. Given the prominent role that Heidegger's account of Being-in-the-world played within the initial movement of phenomenological critique, the question of how it might most fruitfully engage with what we could call the 'positive turn' towards a collaborative dialogue between phenomenology and cognitive science presents itself with a natural urgency.[3]

One way of answering this, of course, would be to deny or at least doubt the feasibility of such a constructive partnership. There is, after all, a continuing debate about the possibility of reconciling naturalist and phenomenological perspectives

in general, to which the project of *Being and Time* adds complications of its own. This paper, however, will proceed from a different starting point. It will set aside these more basic doubts, granting that a cooperation of this nature is possible and worth pursuing for the sake of exploring what kind of approach to cognition then offers itself as a suitable interlocutor for Heidegger's early phenomenology.

My goal here is to suggest that one particularly apposite candidate for joining in a Heideggerian conversation can be found in the enactivist tradition. Enactivism has a long history of phenomenological entanglements. These have, however, focussed largely upon the work of Husserl and Merleau-Ponty; the potential for bringing a Heideggerian perspective to bear upon this intersection of perspectives has often been hinted at, but rarely developed.[4] I want to show here why I think that there are compelling reasons for exploring that partnership and striving towards something like a Heideggerian enactivism. My case will hinge on two main claims: firstly, that the emphasis upon the inextricable intertwining of agent and world renders enactive models of cognition particularly congenial to a mutually enriching dialogue with Heidegger's account of purposiveness; and, secondly, that the temporal structures of the enaction of meaning resonate profoundly with Heidegger's model of the relation between temporality and practice. In drawing out these points of intersection, however, I am seeking not so much to summarise an inquiry as to motivate it. This paper endeavours to participate in a conversation that can be taken much further once the topic has been established. Concomitantly, my discussion operates within certain limits. On the one hand, the need for defining the connections that I wish to illuminate necessitates that I take an interpretive rather than interrogative approach to each of the perspectives I discuss. On the other, my aim of rendering these junctures visible precludes a detailed investigation of the further insights and especially the tensions that they can generate. I will have done all I hope to do here if the notion of a sustained Heideggerian enactivism intrigues as a path worth exploring.

1. A BRIEF OVERVIEW OF ENACTIVISM

The enactivist tradition originated in the study of biology, arising as a response to the enduring question of what defines life.[5] Its distant philosophical ancestors can be found in the philosophies of biology and life advanced by thinkers such as Jakob von Uexküll and Hans Jonas, who affirmed the inseparable connection between an organism and its environment, and posited that the former encountered the latter in terms of significance defined by its own concerns, chief among which

was the crucial striving for survival.[6] In their landmark review of enactivist cognitive science, Froese and Ziemke note that the discourse was influenced heavily by von Uexküll's emphasis upon self-perpetuation as a characteristic distinguishing living from non-living entities, and by his theory of the *Umwelt*—the environment which an organism encounters in ways uniquely shaped by its perceptual apparatuses, and upon which it depends, not only in order to persist, but to be the kind of entity it is in the first place.[7] Meanwhile, the thought of Jonas, a student of Heidegger, offered the insight that living organisms were not only distinguished by self-perpetuation, but a form thereof that a) is metabolic in its exchanges with the environment and b) has to contend against the possibility of annihilation (rather than something just continuing by default because there is no threat, no way that it could cease to be). This means that the organism cannot be understood as what it is in abstraction from its environment. That is, for Jonas, the environment enables the organism to be what it is by being that against which the organism defines itself, that which means that the organism is something rather than nothing by making real the possibility of such nothingness as well as providing the conditions and material for the nature of the something.

The inception of the enactivist approach as we know it today can be traced to the publication of *Autopoiesis and Cognition* by Francisco Varela and Humberto Maturana, which outlined what the authors—then working in theoretical biology—took to be the set of conditions defining biological life.[8] There, Varela and Maturana proposed that a system is alive if it displays what they call *autopoiesis*, meaning that it is a distinct self-unity that generates its own identity and maintains itself against the threat of disintegration, with its components producing and reproducing the processes that produce them.[9] An autopoietic system is autonomous,[10] in that it is its own product; it does not exist in order to bring about something else, to accomplish some externally-defined end, but rather to be and perpetuate itself—its identity is its task. This identity is not, however, cut off from that outside itself; indeed, in producing itself and "the topological domain of its realization as such a network", it is fundamentally coupled with that against which its identity is defined and with which it must engage in order to be the kind of system that maintains itself.[11] A system that is never perturbed, to use a favourite term of Maturana's, is not an autonomous identity; in the words of Varela, "a universe comes into being when a space is severed in two"[12]—the identity of the system cannot exist without that against which it defines itself; it and its other produce and define one another in an extricable symbiosis. The autopoietic system's interaction with the space within and against which it maintains itself

cannot be defined in terms of "inputs or outputs", for it is much more intimate than such an exchange.[13] This is not a kind of system that is left unmarked by something passing through; rather, it is a balanced self-organising whole that encounters 'perturbations' with its entirety, responding holistically to a situation in terms of its own self-production.

Autopoiesis was originally conceived as a defining feature of very basic organic structures and the parts thereof, rather than describing anything occurring at the macro-level of, say, consciousness or experience. Indeed, both Maturana and Varela initially strongly resisted the extension of their concepts to any domains outside of biology.[14] However, the usefulness of their framework in analysing a diverse range of systems (including, for example, social groupings), coupled with Varela's own turn towards adapting autopoietic theory into a model of embodied perception and activity, led to it being applied across the broad spectrum of phenomena associated with cognition, from its simplest building blocks and manifestations—such as in single-celled organisms—to the complex behaviours of human beings. This discourse developed into what we now call enactivism through the publication, in 1991, of *The Embodied Mind*, which Varela co-authored with Evan Thompson and Eleanor Rosch. There, autopoiesis became the foundation for an account of human cognition that took the latter to be always-already situated, embodied and—crucially—active, such that practice and movement came to be seen as crucial to perception and consciousness. That text also saw Varela and his collaborators embarking upon a comprehensive engagement with the phenomenological tradition that had long influenced Varela's thought, a dialogue that would later turn to examine its own ambitions and limits in the collection published as *Naturalizing Phenomenology*.[15]

In addition to motivating a more explicit intersection with phenomenological thought, this transition from defining basic life to analysing human cognition also prompted the refinement of enactivism's conceptual repertoire, as autopoiesis came to be seen as insufficient to fully capture the complexity of what enactivists take cognition to be. Most significant for my present purposes is the development of a notion that Ezequiel Di Paolo, arguably one of the movement's most notable contemporary proponents, calls *adaptivity*.[16] Adaptivity here denotes an autopoietic system's ability to track its progress against the standard set by the conditions required for its continued existence and flourishing, and is now increasingly taken to constitute a further key condition defining what it means for an organism to be a cogniser. This brings to the fore the dynamic, fluid nature of organismic

self-production that is at the heart of enactive cognition. In isolation, autopoiesis constitutes a binary condition, an either/or of survival or disintegration. An adaptive autopoietic organism, however, is capable of more than just absolute presence or absence—it can do better or worse; it can keep annihilation just far enough from itself, with its distance from the point of no return now a variable upon which a great deal hinges; it can generate norms that govern its patterns of responsiveness to perturbations and other circumstances.

Enactivism sees cognition itself as an inherently relational process, a mutual shaping between organism and environment that generates—or *enacts*—a meaningful world determined by the goals, needs and capacities of the former. The situation in which a particular organism finds itself is meaningful in relation to the organism's needs and goals, the most fundamental of which is to sustain its own existence in the face of factors that could dissolve its self-identity. At a very basic level, for example, accumulations of chemicals and particular configurations of matter only become 'nutrients'/'food' and 'sharp objects'/'danger' from the perspective of an organism to which these things matter because they are benefits or risks to its self-perpetuation. This enaction of meaning (which can, of course, become very complex for higher-level organisms) produces and structures the organism's world, which in turn is defined as a network of interrelated significances that are determined by the various purposes of the organism and its underlying concern for self-perpetuation.

2. TRACES OF IMPLIED POTENTIAL: ENCOUNTERS BETWEEN HEIDEGGERIAN AND ENACTIVIST PERSPECTIVES

Now that basic introductions have been made, so to speak, and we have some idea of what the enactivist perspective entails, I want to bring Heidegger back into the conversation. Before I move on to show just why I think that these two are such suitable interlocutors for one another, however, I want to highlight the promise and urgency of their potential partnership by drawing out some of the brief, tantalising meetings they have already shared. While the promise of a 'full-blown' Heideggerian enactivism has not been taken up in the literature, it is important to note that the discourses have often intersected with one another in various ways, arguably rendering the lack of a sustained engagement all the more puzzling.

One significant point of contact lies in the philosophical connections that enactivism and Heideggerian phenomenology share through the work of von Uexküll and

Jonas. Jonas was—as I noted earlier—a student of Heidegger's. *The Phenomenon of Life*, the work of his that had the greatest influence upon contemporary enactivism, engages with Heidegger's thought as both a positive source of insight and an antagonist.[17] Von Uexküll's work, meanwhile, was widely read by participants in the phenomenological tradition—including Heidegger himself, who wrote approvingly of the biologist's affirmation of the importance of "the relational structure between the animal and its environment".[18] While the Heideggerian perspective that I am interested in reconciling with enactivism is the one outlined in *Being and Time*, it is interesting to note that Heidegger later, in *The Fundamental Concepts of Metaphysics*, identified von Uexküll's work as one of two "essential steps" which could help biology progress to a phenomenologically-sound conceptualisation of life, the organism and the environment.[19] Heidegger goes so far as to say that his phenomenology could offer the kind of "radical interpretation" of von Uexküll's ideas that would lend them "the fundamental significance they could have", and that "the engagement with concrete investigations like this is one of the most fruitful things that philosophy can learn from contemporary biology."[20]

This is not, of course, uncomplicated praise. In that same work, Heidegger also strongly differentiates his concept of 'world' from von Uexküll's *Umwelt* and, crucially, rejects the latter's insistence upon a continuity between humans and non-human animals—a contention that, indeed, points to a more general challenge for the pursuit of a Heideggerian enactivism. The range of entities upon which each discourse focuses (and the kinds of entities to which they are willing to attribute the structures that are central to their respective models of world navigation) arguably differ enough to generate significant tension between Heideggerian and enactivist approaches. I do not think, however, that this tension fatally undermines the prospect of dialogue, for reasons that I can only touch upon very briefly here. Enactivism is a well-matched partner for Heidegger's early phenomenology, not only because of their conceptual sympathies, but because of the gaps and underutilised resources that each reveals in the other. Here, I would suggest that this friction invites us to reconsider how we think a broadly Heideggerian framework must conceptualise the distinction between human and non-human animals. The resonances between Heideggerian structures and the model of the enactive cogniser serve as one starting point for a re-imagining of the ways in which an entity might participate in the former. Further exploration of this is beyond the scope of what I can hope to do here; for now, all that I wish to draw out is that the complex history that Heideggerian and enactivist ideas share in itself provides significant motivation for a deeper, prolonged dialogue.[21]

Interactions between enactivist and Heideggerian discourses have not, of course, been limited to their mutual entanglements with the philosophy of biology; there have also been more recent and direct encounters. As I noted earlier, enactivism has a significant history of engaging with the phenomenological tradition, albeit primarily in the form of Husserl's work and, more recently, that of Merleau-Ponty.[22] Here, Heideggerian thought is by no means ignored; it is often mentioned—mostly, however, as part of general lists of frameworks sympathetic to situated cognition, or of examples of phenomenological thought. That is, it is not explored in much detail.[23] I think that one can discern a pattern of almost-but-not-quite meetings between the perspectives which flows onwards through much of the contemporary literature. There are many dialogues between enactivists and Heideggerians, but these are generally not *about* the relation between enactivism and Heideggerian phenomenology itself.[24] When Heideggerian concepts are discussed, they are dealt with in isolation and often quite briefly.[25] What we have, then, is something of a precedent that tempts further exploration—an existing set of entanglements and glancing connections whose very elusiveness makes the possibility of a prolonged encounter all the more promising. An entwined history is not, of course, the primary reason that I want to offer here in urging that this potential be realised. The stronger motivation for bringing these perspectives together lies in their conceptual sympathies; it is to a discussion of these that I shall now turn.

3. GESTURES TOWARDS A HEIDEGGERIAN ENACTIVISM I: BEING-IN-THE-WORLD AND THE ENACTION OF MEANING

I want to suggest that the phenomenology of purposiveness that Heidegger offers us in *Being and Time* and its contemporaneous texts resonates with the enactivist model of life and cognition, intersecting at points that can serve as both connecting anchors and sites of illuminating friction. Here, I shall focus on two such nodes. These are, firstly, the manner in which each framework conceptualises the relation between the world and the entity that navigates it; and, secondly, the relation between temporality and practice that operates either directly or implicitly within each model.

Turning first to the matter of the entity-world relation, I want to suggest that the enactivist view of cognition as an inherently relational process resonates with the Heideggerian conception of Being-in-the-world through, on the one hand, shar-

ing its insistence upon the inseparable entanglement of entity and world, and, on the other, striking a comparable balance between undermining the subject-world dichotomy and maintaining the distinctiveness of the worlded entity. Enactivism and Heidegger's account both describe the relation between entity and world as one that is mutually constitutive and inextricably interdependent. Each aspect renders the other intelligible; each is an enabling condition of the other and, indeed, part of the very definition of what it is to be as it is. The world is, for both discourses, conceived as more than a mere set of environmental circumstances; it is a network of purposive significance generated and oriented by the entity's purposes, needs and capacities. Conversely, for both frameworks, the entity in question is only what it is through having a world; neither can be what it is apart from the other, such that 'apartness' here is not even intelligible.

Recall that, for Heidegger, the way that Dasein relates to its world must not be understood in terms of the latter containing the former; of a subject covering a pre-determined, value and purpose-indifferent objecthood with a merely superficial cloak of salience and meaning; of a transaction between two bounded and separable realms, a fragile congress whose very conceivability must be secured by proofs anchoring one utterly different pole to the other.[26] "Dasein is its world" (***BT***, 416 [364]). Here, we find a sharing of Being; Dasein's world is part of the ontological structure of its very way of Being. Being-in-the-world is an indivisible relation whose constituents cannot even truly be labelled such, for this would imply the adhesion of potentially distinct parts. Dasein would not be without world, and world is structured by Dasein, for its worldhood is constituted in relation to the network of purposive significance oriented around Dasein's projective means-ends directedness. Dasein does not encounter a blank, brute given that it imbues with "subjective colouring" (***BT***, 101 [71]), but a contexture inviting and shaped by practical engagement, entities defined in terms of either their equipmental role or lack thereof.

The enactivist tradition arguably depicts the interconnection between cognising entities and their world in a comparable way. The enacting cogniser is defined by its world-generation and concomitant capacity to respond to the significances it produces; it only comes into being through its relation to circumstances which it must navigate.[27] For enactivists, cognition is inherently situated, rather than a context-independent transaction between the enclosed and potentially isolable spheres of minded computation and external worldly stimuli. It is the sense-making interaction between a self-perpetuating system and its environment, enacting

a meaningful world that in turn continues to shape the system itself. Neither the autonomous cogniser nor the world that it both generates and interacts with to generate itself can be conceived as what they are apart from one another or their role in this interplay.[28] Such a cogniser does not encounter a value-neutral set of properties and parameters; it navigates a world of meaning defined by its needs and self-concern. It does not encounter a certain quantity of particular chemicals, but rather enough (or too little or a surplus of) nutrition; it does not meet aggregates of matter, but obstacles or tools. This world is only meaningful, is only what it is, from and for the perspective of an identity that is concerned for its self-perpetuation and encounters its environs in terms of what helps or hinders its flourishing; the world is for the sake of the worlded entity..

At the same time, however, both discourses also imply that this rejection of the entity-world (or, should we be willing to take up the additional conceptual baggage of such a term, the subject-world) dichotomy need not entail the complete loss of a distinctive locus of concern. I would argue that Heideggerian and enactivist analyses both urge us to take account of the need for a perspective from which and for which the world is oriented, an entity that renders the notion of a world structured by ends and needs intelligible—for these must be had by something. Dasein is not positioned over-against its world, or isolable from it, but it is also not equivalent in kind to the tool-relations and functional significations that constitute the latter (***BT,*** 67-71, 78-86 ff [41-450, 53-59 ff]). Tool-use is integral to Dasein's manifestation of its way of Being, but Dasein is not equipment or a tool-relation; it is differentiated from other entities by the very understanding of Being that enables it to understand their ways of Being and engage with them (***BT***, 27-32 [7-12]). Heidegger's account challenges us, I think, to see the relation of Dasein and world as a unity that at the same time does not dissolve either or equivocate one to the other; they cannot be separated, and yet there is in Dasein that understanding and concern of Being which orients the structures of the world, which render worldhood possible. For the enactivist perspective, meanwhile, there is also an emphasis upon the inseparable integration of the cognising agent and its context without surrendering the ability to define or insist upon a locus of purpose around which the significance generated by the interaction of a being and its environment is oriented. The generation and maintenance of a distinct self-unity is, after all, that which defines autopoiesis, that which constitutes a necessary condition for both life and cognition. Enactivism defines cognition in terms of the system's very ability to maintain a boundary—albeit porous, structural and functional (rather than spatial), and mutually constituted by the world it generates—

and to persist as an autonomous unity; there must be that which can *enact*. This identity is not static; it can be in a state of flux through the changing couplings with its environment and its crucial responsiveness and adaptability in the face of perturbations; however, there must be something to which we can attribute a concern for its continuation and through which the very notion of flourishing in the face of threats against itself—indeed, of a threat as such, of the possibility of disintegration—attains meaning. The enactivist framework, then, is an attractive potential interlocutor for Heideggerian phenomenology because both—in their own ways, distinctly yet harmonically—emphasise the interrelation of entity and world without thereby surrendering the ability to speak of a centre of purpose for and through whom that meaning is generated. "Dasein is its world" (***BT***, 416 [364]), and its world is structured by the functional significations defined in relation to Dasein's purposes, yet Dasein is also that nexus of concern for whose sake purposive significations are laid out. For enactivism, too, the entity at issue, the protagonist of its tale, is not itself—is, indeed, not at all—apart from its environment and the world it enacts, just as that world is constituted by relationally-generated meanings; cognition is a complex, inextricable mutual entanglement. Yet there is that locus which renders the very notion of the significance emerging through cognition intelligible, something to which the conditions it faces matter, in relation to which the meaning brought about by enaction is defined. This resonance is, I think, particularly significant if we consider the context within which many recent debates about the relation between phenomenology and cognitive science take place. The kind of cognitive science that is most often involved in discussions about such potential partnerships is one for whom cognition is not 'skull-bound', and one that takes claims about the situatedness of the cogniser and the immediacy of the world to mean that we must challenge the relevance of believing in an agent who is at all distinct from that which they navigate. I think that the view of the Dasein-world relation that I have set out places constrains what kind of model of cognition Heideggerian phenomenology can engage with, in that I think it demands it be partnered with an approach that rejects an entity-world opposition without losing sight of something that relates, of a Being to whom this relation matters and that is constituted by it. I think that the enactive approach fulfils this requirement remarkably well.[29] That is, if we think that pursuing a dialogue between Heideggerian phenomenology and contemporary cognitive science is a worthwhile endeavour, then the conceptual sympathy between the former and enactivist forms of the latter for which I have tried to argue here can, I would say, serve as a significant reason for settling upon enactivism as a fitting match.

4. GESTURES TOWARDS A HEIDEGGERIAN ENACTIVISM II: TEMPORALITY AND ENACTION

The second of the two 'nodes' of intersection between the discourses that I want to explore here originates in the way that temporality operates in both accounts.[30] I shall suggest that a Heideggerian model of temporality profoundly resonates with the temporal dimension of meaning-enacting cognition to such an extent that we can read the former, not as a structure foreign to and hence imposed upon the latter, but as already structuring it in a sense. That is, the temporality of enaction is already proto-Heideggerian in a way that clears a space for dialogue between them and invites us to bring the two frameworks together.

4.a. Heidegger's Model of Temporality

Making this connection between Heidegger's conception of temporality and the temporal dimension operative in enactivism visible will require that I first devote some space to summarising my reading of the account of temporality offered in *Being and Time* and its contemporaries.[31] Since offering a more comprehensive description or analysis thereof would far exceed the space that I have here, I will focus on roughly sketching out what I take to be three vitally significant characteristics of the way in which Heidegger deals with temporality—ones that, I shall suggest later, we can also recognise in the kind of temporality involved in the enactivist view of cognition. These features are, firstly, a complex, inextricable entanglement with purposiveness; secondly, an emphasis upon radical futurity; and, finally, a fundamental connection to self-concern.

4.a.i. Purposiveness

It is my contention that, for the Heidegger of *Being and Time*, the relation between purposiveness and temporality needs to be conceived as a complex reciprocity, in which each element shapes the other; temporality unifies and enables practice and purposiveness, even as it is itself inherently affected by the latter. If we were to take his text at face value, then the necessity of temporality to practical engagement can be captured in the profound yet simple notion of a foundational relation: temporality unifies and underlies practical engagement. According to Heidegger, temporality, as a fundamental condition of the possibility of our experience, unifies all the structures that comprise our particular way of Being, which includes Being-in-the-world. Temporality is the crucial glue binding all the

elements and processes that Heidegger ascribes to our existence into a coherent whole, providing "the unitary basis for its existential possibility"; it "regulates the possible unity of all Dasein's existential structures" (*BT*, 402 [351]).

I would argue, however, that Heidegger's account also suggests—even if it does not do so explicitly—that we must conceive of temporality itself in purposive terms. That is, temporality does not just ground practical engagement while itself remaining untouched by that connection; the latter also shapes the former, to the extent that temporality itself cannot be understood adequately without taking purposiveness into account. Consider, for example, Heidegger's insistence upon the horizonal nature of temporality. The 'horizon' is that towards which temporality reaches and projects. Each modality or, in Heidegger's terminology, ecstasis of temporality (past, present and future) has a *Wohin*, a where or whither to "which one is carried away", which Heidegger also calls the "horizonal schema" (*BT*, 416 [365]). This schema is different for each ecstasis.[32] This horizonal schema of each ecstasis is defined in what I would call intrinsically purposive terms. The horizonal schema of the present ecstasis is the in-order-to—the assignment that defines the character of equipment and its role in a network of tasks, functions and other equipment.[33] The horizonal schema of the past is that upon which Dasein is thrown or abandoned, cashed out by Heidegger in terms of Dasein having "been delivered over to entities which it needs in order to be able to be as it is" (*BT*, 416 [364]). That is, in order to realise its directedness towards its ends, towards itself as the ultimate sake of its ends, Dasein must deal or engage with other entities. Finally, the horizonal schema of the future is given by Heidegger as the 'for-the-sake-of-which', the primordial self-concern, the acting and striving for the sake of itself, for the sake of its own being, that orients the various networks of practical significance that constitute Dasein's world and its navigation thereof. Stating that the future of original temporality "is carried away"[34] towards this for-the-sake-of-which renders the former fundamentally purposive. It means that the ecstatic outwardness of the future stretches towards an intrinsic mattering, a sake, a *purpose* that is enacted in Dasein's existence as an ability to be. Dasein's relation towards its Being is, after all, a "competence", a *capability*, that is not "something by way of an extra" for Dasein, but its "Being-possible. Dasein is in every case what it can be, and in the way in which it is its possibility" (*BT*, 183 [143]).

These horizonal schemata are crucial to originary temporality functioning in the manner that Heidegger's account requires it to. According to Heidegger, we cannot understand temporality without taking into account its fundamental, radi-

cal openness, its outward-directedness. It is this that enables Dasein's transcendence, the always-already being outside of itself—and being enmeshed with other entities—that underlies the very having of a world and constitutes the ever-prior letting-be through which the possibility of everything Dasein encounters must already be disclosed.[35] This reaching-outwards reaches towards something, projects upon that which in turn renders that which is projected and the projecting itself intelligible, a structuration that we must acknowledge if we are to properly conceive of temporality and its functioning; to do temporality justice, as it were, we must address its openness, and to do the latter requires responding to it as horizonal. If we cannot understand temporality (and its role in constituting our way of Being) without understanding its horizonal nature, and if the horizons of temporality are intrinsically purposive, then we cannot understand temporality adequately without considering it in purposive terms.

4.a.ii. Radical Futurity

Heidegger's account is also, I think, characterised by giving the future—cashed out in terms of a radical and projective openness—a particularly important place in the structure of temporality. This point can be broken down into two distinct but interrelated claims. These are, firstly, that Heidegger's model of temporality privileges the futural mode of temporality; and secondly, that this futurity is conceived in terms of a radical indeterminacy. I will briefly lay out each of these in turn.

With respect to the first of these points, it is worth noting that *Being and Time* asserts the special importance of futurity quite explicitly. For example, Heidegger writes that the reason that he has "always mentioned the future first" is that it "has a priority in the ecstatical unity of primordial and authentic temporality", such that the future is the latter's "primary phenomenon" (*BT*, 378 [329]). The text gives us two reasons for this prioritisation of the future: the futural ecstasis renders possible the anticipatory resoluteness and Being-towards-death that constitute authenticity and are crucial to the structure of Care, and it is intrinsically connected to Dasein's existentiality. It is the latter, arguably less apparent point that I want to draw out here. Heidegger writes that "[s]elf-projection upon the 'for-the-sake-of-itself' is grounded in the future and is an essential characteristic of *existentiality*. *The primary meaning of existentiality is the future*" (*BT*, 375-376 [327], original italics). Recall that existentiality refers to the defining feature of Dasein's way of Being, that is, its comportment towards its own Being, its under-

standing itself "in terms of a possibility of itself" (*BT*, 33 [12]). For Heidegger, this understanding of and concern for its own Being that makes Dasein what it is, and its capacity to stretch towards possibilities for and of itself, are inherently and primarily futural. Blattner captures this well when he notes that temporality "is the ontological sense of Dasein as ability, as something that presses ahead into its self-understanding".[36] This privileging of Dasein's projection ahead, beyond, into possibility gives the futural dimension of temporality an extraordinary significance. Dasein is a primordially futural way of Being—not in a sense of being disconnected from past, present or the unity of the three ecstases, but rather in that futurity guides Dasein's structuration through the very unity in which the future partakes.

This futurity is not one that can be captured in terms of prediction or a concrete anticipation of a determinate goal; this brings us to the second of the two claims that I put forward at the start of this section. Heidegger often emphasises that the projection of a *Worumwillen*, the stretching outwards into possibilities, does not equate to having a particular goal in mind, whether thematically or otherwise.[37] Even in the case of specific concrete practices, the particular goal of a specific task orients the activity and tools engaged with in its accomplishment, but is not always held in mind or focussed upon. Heidegger distinguishes the directedness towards an end from the attainment thereof, and, indeed, its concretisation or determination. This view of purposive end-directedness, coupled with the notion of the originary future as the underlying openness that discloses realms of Being as such, gives us a conception of futurity as radical indeterminacy. The futural is, for Heidegger, an open stretching outwards that is not centred around, nor caught up in the striving for the realisation of, anything determinate. This is an indeterminacy that enables determinacy, grounding the possibility of making and conceiving of particular choices.

4.a.iii. Self-Concern

The final of the three characteristics of Heidegger's account that I wish to highlight here is the connection that it draws between temporality, practice and the self-concern of Dasein. It is this self-concern that defines, and is defined by, futurity and therefore also suffuses Dasein's coming-towards-itself as it takes over its having-been.[38] This relation between temporality and self-concern is one of each shaping and being shaped by the other. On the one hand, that anything can matter to Dasein is due to its temporal nature, for, according to Heidegger, only an

entity structured by a unity of past, present and future can stretch towards possibilities of its own, towards itself as possibility, can encounter anything as having a sake—and can be directed towards its own Being as the sake for which it does anything.[39] On the other, it is this mattering, this capacity to pursue self-concern and the ripples of what we might call the more concrete 'sub-concerns' of practice that shapes temporality itself, as we have seen. Heidegger's account implies that Dasein's self-concern and its concomitant pursuit of related concerns are inseparable from, and crucial to, temporality.

4.b. The Heideggerian Temporality of Enaction

Heidegger's account, then, invites us to understand purposiveness as inherently temporal and temporality as shaped by purposiveness; to view the futural dimension as having a special significance, one that can be cashed out in terms of a radical indeterminacy that transcends mere predictive or anticipatory models of futurity; and, finally, to take temporality as being structured by and structuring the self-concern that defines Dasein. I now want to suggest that the autopoietic enacting of meaning carries within itself a temporality that also and already bears a similar shape. Guided by the three features that I have set out above, I think that we can trace the outlines of a Heideggerian temporal structuration within enactivism, suggesting the kind of deep resonance between the two approaches that calls for a more extensive dialogue between them.

Firstly, I would argue that the autopoietic enacting of meaning also displays the kind of complex mutual shaping of temporality and purposiveness that we can find in Heidegger's account. On the one hand, the purposiveness underlying enaction is unintelligible from an atemporal perspective.[40] The self-generation and maintenance of an autonomous self-unity must happen *across time*. After all, the organism's purposive aiming towards the overall end of survival, as well as its more immediate needs in successfully navigating environmental circumstances, are structured by a directedness towards something which has not been reached yet, and end that is not meaningful apart from an integration into the organism's overall temporal stretching into past and future. This temporal continuum renders the system's present situation intelligible, for it is the same self-unity that has existed previously and been shaped by particular past circumstances whose continuance is at stake here. The world of significance enacted in collaboration with the environment is a temporal one. On the other hand, the temporality of enaction is itself thoroughly purposive, for it is manifested and has meaning in terms

of means-ends directedness, of the purposive carrying over of a past identity into the future as, both, a goal to be striven for, and the motivation of immediate ends.

Secondly, I think that we can also read the temporality of autopoietic cognition in future-weighted terms. The meaningful world generated by the activity of the organism in collaboration with its environment is arguably defined by an orientation towards futurity, in that the future survival of the system that provides the framework for all its actions and the salience that it produces in conjunction with the situations it encounters. Moreover, it is the directedness towards more immediate goals thrown up by the perturbations it undergoes that renders its activity intelligible as cognition. The survival of the organism is not merely a simple not-yet that is to be anticipated or drawn out in a concrete plan, however. This is a future that will never arrive or be finally accomplished. It is an ongoing futurity that orients everything else, and that can never be closed off, for the striving towards it can only end, not with being grasped or secured (for these are not possible) but with the annihilation of the framework that it rendered meaningful, with the disintegration of the system. For the autopoietic, adaptive system, stasis is death; there is no endpoint, only the ultimate ceasing of those processes of resistance and precariousness that define the organism's very life. This is, moreover, a radically open future; it is not one of explicit planning or awaiting of a certain event, but a fluid and adaptive orientation that gives meaning to, and renders possible, the organismic responsiveness to salience.

Thirdly, and finally, the temporality of enaction is, in my view, also always-already oriented by the self-interest of the organiser, even as that self-concern is inherently temporal. From an enactivist perspective, it is the self-concern of the organism that defines and drives cognition, enabling it to exist; there would be no cognition, no autopoiesis, adaptivity or autonomy without or apart from the fundamental drive of the system to persist. This is a temporal self-concern, for it makes no sense without an understanding of the organism's self-perpetuation through time, or of the object of that concern as self-unity with a history and a striving to have a future. This is also a self-concerned temporality. The temporality of enaction is *of the organism and for the organism*; its futurity is structured by the drive towards self-continuation, its pastness through the tracking of the organism's trajectory of flourishing across a field of beneficial or detrimental outcomes, and its presence through the intersection of these in the active moment of self-maintenance.

Beyond pointing towards a promising conceptual sympathy between Heideggerian phenomenology and the enactivist model of cognition, this tripartite intersection between the temporalities operating within each framework also serves to illuminate their shared emphasis upon the importance of temporality. For both perspectives, temporality is crucial to understanding the entities at the centre of their respective narratives, and indeed their accounts as a whole. The enactivist tradition makes this point quite overtly, particularly in its engagement with phenomenology. Varela himself contended that explaining our experience of time was "an acid test of the entire neurophenomenological enterprise", a notion taken up by many enactivist accounts - including, for example, by Evan Thompson in *Mind in Life*, arguably one of the most significant contemporary contributions to the discourse.[41] In the case of Heidegger's account, meanwhile, this temporal orientation is one that is often occluded by the tendency to focus upon the first division of *Being and Time*. While arguing for this point in detail is beyond what I can accomplish here, I would say that fully appreciating the potential of that period in Heidegger's thought requires us to take account of the vital role that he ascribes to temporality in structuring all aspects of Dasein's way of Being.[42] If, as I suggested earlier, we can read Heidegger as claiming that temporality and purposiveness are intrinsically intertwined, founding and structuring one another in a complex mutuality, then we cannot understand the analysis constructed in the first division of *Being and Time*¸ for example, without seeing that temporality is at its core—a place which it also ought to find in our readings.

In my view, this means that these discourses can be brought into a fruitful conversation, not only about the content of their models of temporality, but about the significance that they ascribe to them. On the one hand, the Heideggerian position that I outline above entails that any attempt to utilise Heidegger's conceptual framework in order model purposive cognition must also grapple with the important role that temporality plays within it. Enactivism is particularly well-positioned to do so in light of both, its own insistence that temporality is crucial to investigating and explaining cognition, as well as the resonances between the temporal dimensions of enaction and the structures Heideggerian temporality. On the other hand, this deep congeniality between Heidegger's account and enactivism surely makes the former a particularly interesting potential interlocutor for a tradition like the latter that has such a long history of interest in both phenomenology and the analysis of temporality. The majority of enactivist discussions that connect these two fields focus mainly on the works of Husserl and, to a slightly lesser extent, of Merleau-Ponty; I find it puzzling that so little attention is

given to what a Heideggerian perspective might contribute to that dialogue.

CONCLUSION

The phenomenological tradition has been drawn into many kinds of encounters with the study and philosophy of cognition, including not only the now well-known critiques of certain paths that the latter took, but also more collaborative interactions grounded in the hope that phenomenological insights might be incorporated into new ways of investigating what it means to experience and navigate the world as we do. In this congenial atmosphere, the question of where Heidegger fits into these conversations urges itself upon us. *Being and Time* was, after all, so central in those early, more hostile interdisciplinary engagements. How might Heidegger's narrative of practical engagement and Being-in-the-world situate itself within this relatively new landscape? One particularly potent way of doing so, I have suggested here, would be to enter into a dialogue with the enactivist tradition that has grown out of Varela and Maturana's autopoietic theory of life. Enactivism already carries traces of phenomenology in its blood, an inheritance that manifests more strongly with each new generation of texts. The compatibility of contemporary enactivism with Heidegger's ideas has, however, rarely been explore. This lacuna ought to puzzle the reader of *Being and Time*, for there are such profound resonances between the two discourses that their coming together seems almost fated, rich with the promise of generating philosophically fruitful friction and mutually illuminating dialogues.

Here, I have focussed upon two nodes at which these perspectives intersect. The first such conceptual sympathy lies in the way in which each portrays the relation between the entities that form the protagonists of their respective analyses and the worlds that these entities navigates. For both, the Heidegger of *Being and Time* and the mainstream enactivist tradition, entity and world are bound in a complex, insoluble tangle of mutual constitution, permitting neither to be understood or, indeed, to *be* apart from the other. This position allies Heideggerian phenomenology and enactivism in the context of contemporary debates over the extent to which cognition merges cogniser and world. That is, they share an outlook that rejects dichotomous interpretations of the entity-world relation while maintaining the view of the entity as a locus of concern for which the world is what it is. The second site of harmony between the discourses is grounded in how each views the nature and role of temporality. The model of temporality that Heidegger sets out in the era of *Being and Time* can, I contend, be read in terms of

three key features, that is, a complex mutual founding relation between temporality and purposiveness; an emphasis upon a radically indeterminate futurity; and an inherent connection between temporality and self-concern. In my view, these structures can be recognised already being at work within the temporal dimension of the autopoietic enacting of meaning that enactivism describes, such that we can view the latter as already operating within a Heideggerian temporality. Each discourse's temporal orientation can shed light upon the other through their mutual resonances. The importance that both assign to temporality, moreover, strengthens this bond; the phenomena that each seeks to explore and explain cannot be adequately captured or accounted for without an understanding of temporality. I think that these reflections offer us reason to think that, if we wish to pursue a dialogue between Heideggerian phenomenology and contemporary approaches to studying cognition, then we should look towards enactivist versions of the latter as especially promising interlocutors for the former.

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NOTES

1. This paper is drawn from sections of my recently-submitted doctoral thesis, *Dasein's Temporal Enaction: Heideggerian Temporality in Dialogue with Contemporary Cognitive Science*; sections 1-3 are from chapter 5 of that thesis, and section 4 includes partial sections of chapters 3 and 8.
2. This now-famous description of Artificial Intelligence research (and allied fields) that saw cognition as fundamentally computational and symbol-manipulating first appeared in (and throughout) the work of John Haugeland. See John Haugeland, *Artificial Intelligence: The Very Idea*. Cambridge: MIT Press, 1985. My discussion here refers to the discourse's shift in focus, that is, from the kind of phenomenologically-grounded critique of cognitive science that Dreyfus developed, to a developing phenomenologically-sound cognitive science. See Hubert Dreyfus, *What Computers Can't Do*. New York: Harper and Row, 1972. This is not to say that this project—exemplified by the approaches of figures such as Gallagher, Noë, Wheeler, Varela and Zahavi, as well as Dreyfus himself—has universally replaced the more critical perspective. Most accounts undertaking the 'collaborative approach' also develop phenomenology-based critiques of various models of cognition. Moreover, the 'positive turn' is by no means unanimously accepted, and still faces scepticism from a variety of perspectives.
3. Of course, this question has been posed and addressed in various ways throughout the literature—including perhaps most prominently in recent times by Michael Wheeler. See Michael Wheeler, *Reconstructing the Cognitive World: The Next Step*. Cambridge: MIT Press, 2005. This paper does not seek to negate the possibility of other viable approaches.
4. As I will note later, many enactivists who engage with phenomenology—including Francisco Varela and Evan Thompson, for example—mention Heidegger briefly as one of a number of phenomenologists with whose views they take their tradition to have some compatibilities, often on the basis of what they describe as general phenomenological tendencies (such as the rejection of the subject/object dichotomy or the emphasis upon contextual situatedness). Heideggerian thought receives somewhat more attention in the 'perceptual enactivist' discourse, which (primarily through the work of Alva Noë) built upon Varela's claims about the importance of embodied action in structuring the cogniser's world-navigation to construct what is by now arguably a distinct research project that focuses exclusively on the importance of action and movement in perception. This is not, however, the kind of enactivism that I am interested in here.
5. Here, and throughout this paper, I am drawing on the descriptions of enacting cognition put forward by the following key texts: Di Paolo, "Autopoiesis, Adaptivity, Teleology, Agency" *Phenomenology and the Cognitive Sciences* 4:4 (2006, 429-452); T. Froese and T. Ziemke, "Enactive Artificial Intelligence: Investigating the Systemic Organization of Life and Mind" *Artificial Intelligence* 173:3-4 (2009, 466-500); Evan Thompson, *Mind in Life: Biology, Phenomenology, and the Science of Mind*. Cambridge: Harvard University Press, 2007; Francisco J. Varela, "Patterns of Life: Intertwining Identity and Cognition" *Brain and Cognition* 34:1 (1997, 72-87); and Francisco J. Varela, Evan Thompson and Eleanor Rosch, *The Embodied Mind: Cognitive Science and Human Experience*, Cambridge: MIT Press, 1991.
6. The account offered here of enactivism's philosophical roots draws mainly on Froese and Ziemke, "Enactive Artificial Intelligence", 476-484. Significant examples of enactivist discussions of Jonas can be found in Thompson, *Mind in Life*, 149-157; and in Andreas Weber and Francisco J. Varela, "Life After Kant: Natural Purposes and the Autopoietic Foundations of Biological Individuality" *Phenomenology and the Cognitive Sciences* 1:2 (2002, 109-114).
7. See Froese and Ziemke, "Enactive Artificial Intelligence", 477-478.

8. The book (which is actually comprised of two essays, "Biology of Cognition" and "Autopoiesis: The Organization of the Living") was originally published in 1972 as *De Maquinas y Seres Vivos*. The edition to which I shall refer here is its later English publication as Humberto R. Maturana and Francisco J. Varela, *Autopoiesis and Cognition: The Realization of the Living*. London: D. Reidel Publishing Company, 1980.
9. See Maturana and Varela, *Autopoiesis and Cognition*, 73-84 ff.
10. The enactivist conception of autonomy has varied significantly and controversially over the decades; in addition to its definition being disputed, there has been much debate over whether it constitutes a separate condition for cognition to autopoiesis, and whether either can be taken as a sub-category of the other. In this paper, I will only draw on the way it is discussed in Maturana and Varela's essays. For that treatment, see for example Maturana and Varela, *Autopoiesis and Cognition*, 80.
11. Maturana and Varela, *Autopoiesis and Cognition*, 79.
12. Maturana and Varela, *Autopoiesis and Cognition*, 73.
13. Maturana and Varela, *Autopoiesis and Cognition*, 81.
14.See Humberto Maturana, "Preface to the second edition of *De Máquinas y Seres Vivos - Autopoiesis: La organización de lo vivo*". Trans. Alberto Paucar-Caceres and Roger Hamden. *Systems Research and Behavioral Science* 28 (2011, 590-591); and Francisco J. Varela, "Preface to the second edition of *De Máquinas y Seres Vivos - Autopoiesis: La organización de lo vivo*". Trans. Alberto Paucar-Caceres, Roger Harnden and Karina Cornejo. *Systems Research and Behavioral Science* 28 (2011, 611-13).
15. *Naturalising Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science*. Eds Jean Petitot, Francisco J. Varela, Bernard Pachoud and Jean-Michel Roy. Stanford: Stanford University Press, 1999. Varela details his engagement with phenomenology in the "Preface to the second edition", 603-604.
16. My discussion of adaptivity here refers mainly to the discussion in Di Paolo, "Autopoiesis", 437-444.
17. Jonas engages with Heidegger primarily in terms of a critique of what he sees as the latter's theological underpinnings, which Jonas thought influenced Heidegger's focus upon the human instead of organisms in general. *The Phenomenon of Life* is nowadays often published with essays about Heidegger's 'theology'—as well as Jonas' famous repudiation of his former mentor's Nazism. See the new edition of *The Phenomenon of Life: Toward a Philosophical Biology*, Evanston: Northwestern University Press, 2001; and Di Paolo's review, "*The Phenomenon of Life*, by Hans Jonas" *Journal of the British Society for Phenomenology* 36:3 (2005, 340-342).
18. Martin Heidegger, *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*. Trans. William McNeill and Nicholas Walker. Bloomington: Indiana University Press, 1995, 263 [382].
19. Heidegger, *The Fundamental Concepts of* Metaphysics, 261 [379].
20. Heidegger, *The Fundamental Concepts of* Metaphysics, 263 [383].
21. That these connections between Jonas, von Uexküll and Heidegger point to potential connections between contemporary enactivists and Heideggerian perspectives has even been suggested—albeit not yet taken up—by enactivists themselves. Froese and Ziemke mention that "Heidegger's existential account of the living mode of being still deserves further study, especially in relation to the biological foundations of enactive cognitive science". See Froese and Ziemke, "Enactive Artificial Intelligence", 241.
22. I am not, of course, ruling out that the brevity of enactivism's engagement with these ideas may be motivated by plausible doubts about their utility for enactivist approaches. One important potential reason for such scepticism may be that Heidegger says little about embodiment, whereas

this issue is central to many contemporary enactivist accounts. However, I would maintain that the resonances between Heidegger's general framework and enactivism are sufficiently significant yet too underexplored to generate interest in a prolonged dialogue. After all, I am not suggesting that Heideggerian phenomenology is the only or best interlocutor for enactivism; the need for dialogue between them is not built upon each being able to address all of the other's major concerns, but rather upon the significance of the points at which they do intersect—particularly with respect to temporality. I think that, just as—for example—Merleau-Ponty's analyses of embodiment may offer enactivism insights that it cannot find in other phenomenologies, so Heidegger's account of temporality can (for reasons that I can only begin to touch upon here) offer enactivism something unique, vital, and salient to some of its core concerns. Similarly, its existing intersections with enactivism may well offer a Heideggerian approach more reasons and room for re-imagining the role of the body within its framework. Heideggerian and enactivist discourses will be enriched by adding more of each other's insights to their respective conceptual repertoires than they have at present.

23. The only notable exception here can be found in Fernando Ilharco's conference paper, "Building Bridges in Phenomenology: Matching Heidegger and Autopoiesis in Interpretive Research", which was presented at the Second International Workshop of the Phenomenology, Organisation and Technology Workgroup, at the Catholic University of Portugal in Lisbon in September 2003. Ilharco draws on what he takes to be phenomenological accounts of essence, language and the destruction of the history of ontology to link the way each discourse figures in information systems and interpretive organisational research.

24. Examples of such dialogues include the debate between Evan Thompson and Michael Wheeler in their *Mind in Life* symposium published in the *Journal of Consciousness Studies* 18:5-6 (2011). See also the various interactions between Wheeler and Ezequiel Di Paolo over the years, notably their joint paper "Existentialism and Cognitive Science" *The Continuum Companion to Cognitive Science*. Eds Jack Reynolds, Ashley Woodward and Felicity Joseph. London: Continuum, 2001, 241-25; and Di Paolo's review of Wheeler's book, "The Quiet Heideggerian", *Artificial Life* 13:2 (2007). These get tantalisingly close to, but never fully take up, discussions of the resonances between Heideggerian and enactivist approaches.

25. One significant example of this is the way that Heidegger's analysis of *Befindlichkeit* has featured in the discourse. One of the few Heideggerian concepts that has been discussed frequently in enactivist literature, it features in both classic and contemporary texts in a manner that exemplifies the tendency to take up Heideggerian concepts while mentioning their relation to Heidegger's overall account only briefly or not at all. See, for example, Francisco Varela, "The Specious Present: A Neurophenomenology of Time Consciousness" *Naturalising Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science*. Stanford: Stanford University Press, 1999, 266-314; and Giovanna Colombetti, *The Feeling Body*. Cambridge: MIT Press, 2013.

26. Throughout this section, I am drawing upon Heidegger's discussion of Being-in-the-world and his contrasting of his model with other conceptions of the entity-world relation. See Martin Heidegger, *Being and Time*. Trans. John Macquarrie and Edward Robinson. Oxford: Blackwell Publishing, 2009, 78-148 [52-113]. Henceforth, all direct quotations from *Being and Time* will be noted as *BT* by parenthetical reference in the text. As here, these will list the page numbers of both the translation and the original.

27. For examples of such an account of cognition, see Di Paolo, "Autopoiesis," 429-452ff; Froese and Ziemke, "Enactive Artificial Intelligence," 466-500; Thompson, *Mind in Life*, 3-165ff, especially 3-87; Evan Thompson, "Life and Mind: From Autopoiesis to Neurophenomenology. A Tribute to

Francisco Varela," *Phenomenology and the Cognitive Sciences* 3 (2004): 381-398; Steve Torrance, "In Search of the Enactive: Introduction to the Special Issue on Enactive Experience," *Phenomenology and the Cognitive Sciences* 4, no. 4 (2006): 357-368ff; and Varela, Thompson and Rosch, *The Embodied Mind*.

28. This is point is often made by enactivists discussing their tradition's emphasis upon the always-already situatedness of the cogniser. For a particularly illuminating discussion, see Ezequiel Di Paolo, "Extended Life" *Topoi* 28:1 (2008, 15-20).

29. Situating enactivism like this is admittedly somewhat controversial, for some participants in that tradition (such as Di Paolo) have contended that enactivism should be seen as either allied to, or even more radical than, extended or distributed models of cognition. See Di Paolo, "Extended Life", 9-21; and Michael Wheeler, "Mind in Life or Life in Mind?" *Journal of Consciousness Studies* 18:5-6 (2011, 148-167).

30. Accounts connecting Heidegger's model of temporality with the enactivist tradition have, I think, often come very close to being realised, without ever fully being pursued. One good example of what I mean here is provided by Varela himself, since he notes that the Husserlian model of temporal experience that constitutes his primary phenomenological source is not always useful or sufficiently developed, whereas Heidegger had "a great deal to say about the topic." See Varela, "The Specious Present", 297. Indeed, he later draws upon Heidegger's accounts of absorption in practical engagement, the un-ready-to-hand, and *Befindlichkeit*; however, instead of considering what Heidegger had to say about these elements' connection to temporality, he does not pursue the idea. Ilharco's paper, mentioned earlier, once again is notable for at least suggesting this connection, offering a short paragraph of analysis.

31. The limitations of scope and space here mean that I will not be able to offer a detailed account of Heidegger's different temporal concepts, such as *Weltzeit* or *Temporalität*.

32. For Heidegger's discussion of horizons here, see *BT*, 415-418 [364-366].

33. Heidegger defines the *Um-zu* throughout his discussion of Being-in-the-world; see especially *BT*, 95-102 [66-72].

34. Martin Heidegger, *The Basic Problems of Phenomenology*. Trans. Albert Hofstadter. Indianapolis: Indiana University Press, 1988, 377 [267].

35. Heidegger discusses this openness of temporality and the importance of the horizonal nature of ecstatic temporality in underlying transcendence throughout the various parts of his account of temporality. See particularly *BT*, 415-418 [364-366]; Heidegger, *The Basic Problems of Phenomenology*, 412-429 [291-302]; and Martin Heidegger, *The Metaphysical Foundations of Logic.* Trans. Michael Heim. Indianapolis: Indiana University Press, 1992, 136-216 ff [170-280 ff].

36. William Blattner, *Heidegger's Temporal Idealism*. Cambridge: Cambridge University Press, 1999, 117.

37. See, for example, *BT*, 385-386 [336].

38. Heidegger hints at this in places like *BT*, 285-286 [336-337].

39. See, for example, *BT*, 285-286 [336-337].

40. Di Paolo makes this point particularly insightfully when he argues in favour of adding a notion of adaptivity to enactivist definition of cognition, contending that such a fluid concept is crucial to capturing the dynamics of life in terms of a "multi-scaled and directed temporality". For him, there is "a *minimum temporal granularity* in adaptivity" that is necessary to make sense of sense-making, to account for the ways in which "the ongoing coupling with the environment, and the precariousness of metabolism, make their collective action [of the organism's adaptive systems] also self-renewing, thus naturally resulting in *valenced rhythms of tension and satisfaction.*" See Di

Paolo, "Autopoiesis", 444-445. (Original italics.)
41. Varela, "The Specious Present", 267; for Thompson's response, see, for example, *Mind in Life,* 329.
42. While many commentaries do overlook the importance of temporality within the analyses of *Being and Time* and its textual contemporaries, there are, of course, scholars who have taken up the challenge of giving temporality a central role in their readings. These include, of course, Blattner's seminal treatment of the subject, in *Heidegger's Temporal Idealism*; Françoise Dastur, *Heidegger and the Question of Time*. Trans François Raffoul and David Pettigrew. Atlantic Highlands: Humanities Press, 1998; John Haugeland in *Dasein Disclosed: John Haugeland's Heidegger*. Ed. Joseph Rouse. Cambridge: Harvard University Press, 2013; and Jack Reynolds, *Chronopathologies: Time and Politics in Deleuze, Derrida, Analytic Philosophy, and Phenomenology*. Lanham: Lexington Books, 2012.