EXTENDING THE HUMAN MIND

Evolution and the Mind

ABSTRACT

Mind, body and technology have shaped each other from the beginning and will continue to do so until the very end, says Stiegler.

What concept of mind befits this vision? Certainly not the traditional view of mind as processing power encased in a brain. The new 4E view of cognition assumes that cognition is not brain-bound but embodied. Within 4E cognition, the concept of Extended Mind, might be a good fit. It turns out that it is, but not in its first formulation.

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Words: 3497

Introduction

Once upon a time, we humans expected our future to be much like our past. But this is no longer the case. Technology is rapidly changing our lives, the speed of change now picking up exponentially. In fact, "we won't experience 100 years of progress in the 21st century — it will be more like 20,000 years of progress" (Kurzweil, 2004). Suddenly, it seems, technology is taking over our lives. Yet it has long been regarded as merely applied science; and applied science as the operational outcome of philosophical thought. Philosophy of technology was "nearly non-existent" (Bunge, 1966) until fairly recently. Although *technology* has Greek origins (meaning the knowledge to craft or build something, first used in shipbuilding), the Meriam-Webster says the word was not used before 1829.

Stiegler (1952-2020) has proposed a radically new view of technology which "destroys the traditional thought of technics, from Plato to Heidegger and beyond" (1998a, p. 136).

Central question

Stiegler is a proponent of the phenomenological approach to technology, in the postmodern tradition of continental philosophy, concerned with meaning and existence. On the other side of the well-worn divide, we find analytical philosophy, in its modern form of philosophy of mind and its penchant for logic. Both sides make important claims about the nature of cognition in relation to technology, and are widely read – each within their own bubble. Can this divide be bridged? First, I will summarise Stiegler's ideas of the non-biological (technical) evolution of humankind and the role of cognition as described in Technics & Time volumes 1 and 2. Next, a brief sketch of the emerging field of 4E cognition: embodied, extended, embedded and enactive mind, as opposed to traditional cognitivism. I will then match up Stiegler's ideas with *extended cognition,* originally formulated by Clark & Chalmers (1998) and discuss the results.

Stiegler and the invention of the human mind

Stiegler recalls the myth of Epimetheus, who was tasked with handing out qualities to all living creatures but accidentally passed over the humans so they received nothing; next of Prometheus, who stole the fire, providing humans with their first technology. Prometheus was punished severely by the Gods for stealing, as subsequently the humans were, through Epimetheus's acceptance of Pandora's box. From these stories we come to understand that technology is a mixed blessing, both an enabler and a disruptor, a *pharmakon* (1998a, p. 195)[1]. The underlying image is that of the first humans being naked and vulnerable, i.e. maladapted to their environment. They started incorporating technology simply so they might live and thrive.

[1] Stiegler has written extensively on both causes and effects of ever expanding technology.

THE THIRD MEMORY SYSTEM

Drawing on Leroi-Gourhan's work, Stiegler views the psychological, social and technological aspects of human life as processes that have co-evolved over time. This co-evolution requires the storage of re-usable information across generations. Epigenetic (individual) memory won't do the trick, because it ends with the individual. Neither will phylogenetic (species) memory because it cannot incorporate individual experiences. Stiegler identifies a third kind of memory which is *epiphylogenetic:* the tools and techniques, i.e. technology, that we create as exteriorisations of our cognition (1998a, p. 177). Through *epiphylogenetic* memory, we humans are able to create a future which as individuals we will not be part of, using experiences which we did not create personally. We do not simply live and die, we also create our own future/ Paradoxically this concept of future is both forward- and backward looking, simultaneously being based on and allowing for *anticipation*. We can anticipate this future, desire, fear, accommodate and change it with imagined hind-sight (1998a, pp. 153–154). This, then, is what elevates us above the other animals and indeed above original 'savage man' (1998a, p. 121). Also important is the possibility of shared access opened up by epiphylogenetic memory, connecting the individual to the group. It provides the stepping stone for the eventual development of culture as a social program, by externalising the accumulation of experience.

THE EVOLUTION OF MAN

Stiegler takes from Simondon the idea that an individual and its environment are not separate, but intertwined, in ongoing interdependence and mutual construction. We create ourselves, we individuate through technological objects which externalise our existence. As Stiegler puts it, "the who is nothing without the what" (1998a, p. 141). He emphasises that the development of mankind began at the feet, not the brain. Walking upright freed the hands for the manipulation of tools and instruments. Using hand and tools freed the mouth for speech. This is the general pattern: we free up our organs for new uses through technology. The brain "plays a role, but is no longer directive. It is but a partial element of a total apparatus, even if the evolution of the apparatus tends toward the deployment of the cerebral cortex" (1998a, p. 145). In spite of its minor role, the brain underwent significant changes in the course of our evolution. The first rupture between man and animal occurs when the Australopithecus started to walk. The head became larger, offering stability to the newly bipedal animal. This larger head provided more room for the brain to grow, which is a precondition for cortical organisation. Stiegler regards this stage as determined both by genetics and by exteriorisation through tool use which is mirrored in the cortex (1998a, p. 155). New connections developed between the central nervous systems and part of the body. The hand, for instance, became more and more multifunctional, drawing on the plasticity of the cortex to maintain and develop the physical connection between brain and body. This series of changes culminates in the Neanderthal, where Stiegler locates the second rupture, and the proces of *epiphylogenesis* commences.

STIEGLER ON COGNITION

There is little else about how cognition works in Stiegler's Time and Technics. But he does say how it does not work. He pits himself against Fodor, a proponent of functionalism which holds that a mental state is defined not by its internal constitution but by its function. Fodor believed that mental states are functional states which are realised by physical states of the brain. He also believed in a language of thought, *mentalese*, and in specialised brain modules. Stiegler takes exception to Fodor's use of the expression 'mental organ': "Fodor can elaborate his theory of the mind's modularity through the 'distinction' he makes regarding the word 'organ': it would 'contain' an innate propositionality qua faculty of language, and an organizing of the mind into modalities comparable to the structure of a computer equipped with 'peripherals' (1998b, pp. 168–169)". Stiegler use the word 'organ' in its original Greek sense of ὄργανον, meaning 'tool' or 'device', and distinguishes three kinds only: physiological, technical and social organs in a transductive relationship, i.e. one cannot change without the other. There is some criticism of Stiegler's interpretation of Fodor (Erkan, 2020), but for Stiegler, there is no such thing as a brain module or function that can exist separately from the outside world.

4E cognition and the revolt from phenomenology

Philosophy of Mind in its present form grew out of an interest in *mindreading,* the mental capacity allowing us to attribute mental states such as thoughts, feelings and intentions to each other and to ourselves. It started off in the 1970s, which were the heydays of functionalism but also a period when researchers started to collaborate across disciplines, working towards an empirically verifiable, scientific theory. Two families of accounts have emerged from decades of philosophical debate: the traditional account and what I will call the phenomenology-inspired account.

THE TRADITIONAL COGNITIVIST ACCOUNT

On the traditional account, one ascribes mental states to another person in a kind of observational stance. Social interaction or context does not play much of a role. The claim is that we mindread to explain and predict the behaviour of other people. It is assumed that *mindreading* 'happens' in the brain. This allows for multiple realisability, i.e. every mental state is identical to some brain state - without claiming that any specific mental state is to be equated with a specific brain state. There are variations. On the representational theory of mind, favoured by Fodor, mental processes like reasoning, imagining and thinking are thought of as sequences of intentional mental states. The computational theory of mind take a further step: mental processes are computations, rule governed sequences that can be evaluated semantically.

Within the traditional account, there are two main streams. Theory-theory (TT) assumes that we have a working hypothesis of how the mind works. The system of inferences is a layman's psychological framework, comprising concepts, laws and rules; in short, a theory. Simulation theory (ST) does not require such a theory,

stipulating that we understand the mental states of other people directly, by putting ourselves in other people's shoes, and imagining how we would feel and behave in their situation. Hybrid accounts also exist, combining elements of both theories.

THE PHENOMENOLOGY-INSPIRED ACCOUNT

Recently Gallagher (2012, p. 194) challenges four suppositions that underlie traditional accounts of mindreading.

- *Hidden minds*: we have no direct access to the mental states of other people. So we need something like mindreading, to understand the mental states of others by inference or simulation.
- *Mindreading* as default: our mindreading practices are ubiquitous. It is our number 1 method for understanding others.
- *Observational stance*: we observe others from a third-person point of view.
- *Methodological individualism*: a mindreading process is not shared, it is confined to the individual.

This is not Stiegler's argumentation, but he would share the overall idea that cognition is not confined to individual brains. Gallagher's phenomenology-inspired account focusses on direct personal experience rather than on third person observation. We rarely ascribe mental states such as emotions of intentions through inference. Rather, we perceive them directly in our social contact with others, through their actions, gestures and expression. Underlying this approach is the 4E conception of the mind: mental processes are embodied, embedded, enacted and extended – and **not** brain-bound. The history of 4E Cognition goes back a little further. Newen, de Bruin & Gallagher (2018, pp. 4–5), identify four sources:

- the hypothesis of the Extended Mind (Clark & Chalmers, 1998) which was in turn inspired by Hutchins (1995);
- The Embodied Mind (Varela, Thomson & Rosh, 1991) which was inspired by earlier work on autopoiesis by Maturana and Varela.
- A case study by Flor & Hutchins (1991) on distributed cognition in teams
- Gibson (1979)'s Ecological approach to Visual perception.

Most of these authors are not referred to by Stiegler in Technics & Time, except for the work by Matura & Varela. Stiegler identifies the 'rupture' at the Neanderthal stage, when we start using epiphylogenetic memory as "a singular process of structural coupling in exteriorization that we are calling an instrumental maieutics, a 'mirror proto-stage in the course of which the differentiation of the cortex is determined by the tool just as much as that of the tool by the cortex: a mirror effect whereby one, looking at itself in the other, is both deformed and formed in the process" (Stiegler, 1998a, p. 158).

The phrase *structural coupling* has a footnote referring to Maturana & Varela and reoccurs several times (1998a, pp. 59, 158, 176 and 1998b, pp. 167, 173, 174, 176). *Structural coupling* has a specific meaning in autopoietic theory: a symmetrical relationship with the environment whereby the organism and the environment influence each other without loss of viability. Stiegler even endorses Varela in his

critical assessment of traditional cognitivism. He also raises interesting points on the difference between a Turing machine and an animal (autopoietic) system in relation to free will and programmability (1998a, p. 119; 1998b, p. 177). His worries were later successfully addressed by Di Paolo (2005, pp. 433–434) in a critique of Weber & Varela (2002), introducing the notions of *robustness and active homeostasis*, but for reasons of space will not be elaborated on here.

4E COGNITION, A FAMILY OF CONCEPTS

Before diving into the mapping of Stiegler's ideas on *extended cognition*, let's first locate it within the 4E family. Newen et al (2018, pp. 6–8) usefully provide an overview which is summarised in the table below.

- All 4E-cognition allow for or depend on cognition located in a brain-body-environment unit, i.e. not just beyond the brain, but also beyond the body.
- Only enacted cognition insists on an active engagement with the environment (Varela, Thomson & Rosch, 2017, pp. 205–206); other 4E cognition does not.
- Another important point is how the different parts of cognition are connected. When I type this sentence, is my cognition essentially based on the keyboard, is it part of my cognition? This would be the strong position, relating in terms of a mechanism, where the lower levels 'realise' the upper levels. Or is my cognition merely causally dependent on my keyboard? This would be the weaker position, looking backwards along a chain of cause and effect.

	Cognitive process	**Embedded**	**Extended**	**Embodied**	**Enacted**	
	Strength				Strong	Weak
Location	Bodily = brain-body	possible	included	possible	included	included
	Extra bodily = brain-body-environment	possible	Yes	possible	yes	yes
	Connected to action	no	No	no	yes	yes
Relation	Essentially based on (strong)	no	Yes	Yes	yes	no
	Causal (weak)	yes	No	no	no	yes

Table 1 4E Cognition forms

The table shows that extended, embodied, and enacted cognition may denote the same kind of cognitive process, namely when *essentially* based on *action-oriented* cognition and located in the *brain-body-environment*.

The Extended Mind hypothesis

How can external objects be part of our minds? When Clark & Chalmers' seminal paper first came out, it was regarded as a bit strange, yet it soon became the most quoted of its decade. Ned Block liked to say that the thesis was false in 1995 but since has become true, with the advent of smart phones and the like (D. J. Chalmers, 2019). So what exactly is this thesis? This is no easy question to answer. There are those who speak of the Extended Mind hypothesis in terms of 'waves' , i.e. new versions in response to criticism. According to Gallagher (2018) and Kirchhoff & Kiverstein (2019) we are now in the third wave, which adds predictive

processing as a unifying principle to cognition: we constantly try to minimise errors in dealing with the environment. This may be equivalent to answering the why-question of cognition, which Stiegler answers from the concept of naked mankind trying to overcome its maladaptation to the environment. However, predictive processing is the very latest kid on the block, and a specific extension of the Extended Mind thesis on which Clark and Chalmers themselves seem divided[2].
In a recent collection of essays, Chalmers (2019, p. 7) proposes a more precise formulation of the original thesis, and invites Clark to endorse it. Which Clark does (2019, p. 268), dubbing it the "sensorimotor liberation" version. This is it:

> *A subject's cognitive processes and mental states can be partly constituted by entities that are external to the subject, in virtue of the subject's sensorimotor interaction with these entities*

The famous example is that of Otto and Inga. Inga wants to go to MoMa, the Museum of Modern Art in New York. She remembers where it is (53rd Street) and goes there. Otto has Alzheimer's and cannot rely on his memory. He uses a notebook to write down and look up things. He also wants to go to MoMa. He looks up the address in his notebook, and goes there.
If either of them had been asked at another time, if they knew where the museum was, they would have said 'yes', even if not consciously thinking of 53rd street. Because that fact can be recalled from either memory or the notebook. Not always – Otto cannot read his notebook under the shower, and when Inga is asleep or drunk, she does not have normal access to her memory.

So what is the difference between Otto and Inga's cognitive process? Nothing at all, on the Extended Mind thesis. If a process counts as cognitive when it is done inside the head, in this case memory, it should also count as cognitive when it takes place outside the body. This reasoning is known as the *parity principle*. It effectively says that there is nothing special about processes taking place in our brain – no 'mark of the mental', no intrinsic intentionality.
The phrasing "in virtue of the subject's sensorimotor interaction with these entities" is new. Originally it read "when those entities play the right role in driving cognitive processes"- the right role being *active* and *ongoing*, not passive and distal. It turns the Extended Mind thesis into an embodied and enactive proposal (see table 4E Cognition forms on page 5). The change was made to accommodate one particularly insightful criticism: on the old definition, replacing a set of brain cells with a chip would also qualify as extended mind (D. J. Chalmers, 2019, pp. 7–14). his even the most ardent opponents of the Extended Mind thesis would accept, but make the thesis itself uninteresting.

[2] See D. Chalmers, personal communication, 21 October 2020, added as an appendix to this paper.

Stiegler and the Extended Mind

This new formulation of the Extended Mind thesis captures Stiegler's thinking on cognitive processes exactly. We can extend our cognitive processes by incorporating environment, by producing flint, speaking, construct a shelter, or whatever. We can further extend our newly extended cognitive processes, i.e. we can extend our extended mind. Chalmers & Clark stipulate that this must be through sensorimotor experience, which is the approach that Stiegler also favours[3].

Stiegler, however, goes further because of his evolutionary focus: "what cognitive science does not think is the coupling of the who and the what as older than either the who or the what as such" (1998b, p. 164), i.e. we are fundamentally changed by the proces of structural coupling with the environment. Stiegler also draws attention to the fact that the environment is shareable by groups as well as by individuals, allowing for social development of cognition as well as individual development. Clark and Chambers do not have a developmental story.

Some issues to be resolved

There are issues with the Extended Mind thesis which, as we have seen, now also apply to Stiegler's view. I mention three which have sparked much philosophical interest.

BOUNDARY

The perception-action boundary is regarded by Chambers (2019, p. 17) as the most fundamental objection. We naturally feel the world coming to us through perception; we affect the world through action, i.e. our cognition seems to operate between action and perception. Replacing brain tissue by a chip falls neatly between the boundaries of perception and action, but Otto's notebook or the caveman's flint does not: he needs action and perception to make use of it. So if the action-perception boundary exists, the Extended Mind thesis is false.

RELATION

The Extended Mind thesis supposedly confuses constitution with the much weaker causality relation. This is the coupling-constitution fallacy. "Question: Why did the pencil think that 2+2=4? Clark's Answer: Because it was coupled to the mathematician" (Adams & Aizawa, 2001). This issue turns on the metaphysics and logic of mechanistic explanations[4].

CONSCIOUSNESS

If there is extended, embodied, enacted cognition, does that also hold true for consciousness? Chambers (2019, pp. 17–20) thinks not, because consciousness requires direct availability of cognition. Processes that are extended via perception and action do not. So on his view, consciousness is bound by the perception-action boundary, whereas cognition is not.

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[3] See "The phenomenology-inspired account" on page 4

[4] See Abramova & Slors, 2019, pp. 18–19 and Krickel (2017) for a solution.

Conclusion

Stiegler's view on how the human mind creates itself through technology is a good fit with the Extended Mind thesis – in its recent restated formulation.

There are issues with the Extended Mind thesis. It would be interesting to examine how Stiegler's views would hold up to these. Both theories are largely descriptive, but perhaps testable predictions can be drawn out.

The Extended Mind thesis itself turns out to be not just *extended*, but also *embodied* and *enactive*. Stiegler himself has expressed an preference for a specific variety of enactivism, namely Autopoietic Enactivism, which like the Extended Mind thesis, has been restated since its first conception. These theories seem to start overlapping. Stiegler's views also include a developmental and a social story, which the Extended Mind thesis does not focus on, but is addressed in other enactivist theories. This might be the topic of a further paper.

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Appendix

Wertwijn, I.J. (Inge)

From: David Chalmers <chalmers@nyu.edu>
Sent: 21 October 2020 18:08
To: Wertwijn, I.J. (Inge)
Subject: Re: <Q> your views on predictive processing

dear inge,

i don't think i've written about predictive processing. i'd say it's certainly important. i'm certainly in favor of a bayesian probabilistic approach to perception and cognition. but i'm skeptical about some of the bolder claims that predictive processing proponents (including andy) make that go beyond this, e.g. about predictive processing explaining most of cognition. i haven't thought too much about the connection to the extended mind -- i'd think that predictive processing per se is neutral on that issue, and the extended mind hypothesis as i think of it is neutral on predictive processing.

cheers,

dave.

>From inge.wertwijn@student.ru.nl Wed Oct 21 07:09:29 2020
>From: "Wertwijn, I.J. (Inge)" <inge.wertwijn@student.ru.nl>
>To: "chalmers@nyu.edu" <chalmers@nyu.edu>
>Subject: <Q> your views on predictive processing
>Date: Wed, 21 Oct 2020 11:09:20 +0000
>
>
>Dear Professor Chalmers,
>
>Apologies for barging in like this, but I have a question which you must know the answer to, and I cannot find it anyhwere in current literature.
>
>Brief introduction: I am a research master student at Radboud University in Holland, trying to do a mapping between Stiegler's ideas on human evolution and the Extended Mind thesis. I am trying to work out which formulation of the EM thesis is endorsed by both you and Andy Clark. Your rephrasing and subsequent endorsement by Andy Clark has been very helpful.
>
>But I have a further question.
>What are your views on predictive processing, the so called third wave in in the Extended Mind thesis?
>
>I have read your article in the new book on Andy Clark and his critics, but although there is a lot about predictive processing in the book, there is nothing about in your article. Nor indeed in any article that I can find.
>Do you personally have views on this? If so, would you give me a pointer to literature or perhaps express your view in a few lines? I would be very grateful.
>
>Many thanks,
>
>Inge
>