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*Supersizing the Mind: Embodiment, Action, and Cognitive Extension*

by Andy Clark

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## The Mindsized Mashup Mind Isn't Supersized After All

I rather like Andy Clark's book, *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*, but it certainly hasn't put my mind at rest. As always Clark's writing is uncomplicated and energetic, managing to make everything, from the physiology of the moving body, through an analysis of the scaffolding role, he maintains is, played by language, to the strategic use of representation, computation and control by the biological brain, both intelligible and interesting. And I have a great deal of sympathy with his main thesis: that we must consider the whole body, rather than merely the brain, as the locus where sensing and acting are synthesized and through which cognitive systems can engage with their world. But still I find that I have a couple of rather fundamental reservations, alongside a number of ancillary comments that arise from my own puzzlement with some – of what can at first glance seem – disarmingly simple claims.

We will come to my concerns very soon, first we must get our bearings with a brief overview of the text and what exactly it is that Clark is setting out to achieve.

The book has ten chapters – if you count the two pages that constitute Chapter Ten as a chapter – a very useful Introduction in which the two fundamental positions of BRAINBOUND and EXTENDED are set out, and an Appendix which is a re-presentation of the original “The Extended Mind” article written by Andy Clark and David Chalmers in 1998 and published in *Analysis* 58(1), pp. 7–19. The chapters fall under three main section headings: From Embodiment to Cognitive Extension, which presents practical examples of extended cognition, contains (1) The Active Body, (2) The Negotiable Body, (3) Material Symbols, and (4) World, Incorporated; Boundary Disputes, which is concerned with countering objections to the extended mind thesis, contains (5) Mind Rebound?, (6) The Cure for Cognitive Hiccups (HEMC, HEC, HEMC ...), and (7) Rediscovering the Brain; and finally, The Limits of Embodiment, in which Clark engages critically with enactivism, contains (8) Painting, Planning, and Perceiving, (9) Disentangling Embodiment, and (10) Conclusions: Mind as Mashup.

The chapter titles are clever and apt, and for the most part they are good indicators of their content, though “Material Symbols” and “The Cure for Cognitive Hiccups (HEMC, HEC, HEMC ...)”

carried with them an air of mystery. The former refers to an examination of language “as a form of mind-transforming cognitive scaffolding: a persisting, though never stationary, symbolic edifice whose critical role in promoting thought and reason remains surprisingly ill understood” [p.44]; and the latter refers to the distinction wrought by Robert Rupert (2004) between the Hypothesis of Extended Cognition (HEC) and the Hypothesis of Embedded Cognition (HEMC), which represents and defends a conservatism with regard to the extension of the mental, and which yields, according to Clark the “argumentative oscillation from HEC to HEMC to HEC to ...”, hence “cognitive hiccups”, and to which, in section 6.13, he, Clark, administers a ‘cure’: “to stop worrying and enjoy the ride” [p.139]. We will return, towards the end, to the notion of language as a symbolic edifice.

Clark begins by distinguishing two broad positions: (1) that the brain is all that is necessary for cognition (BRAINBOUND), and (2) that cognition isn’t necessarily extended but that it can, and often does, depend directly or constitutively on non-neural structures including and extended beyond the body (EXTENDED); as he says:

[T]he actual local operations that realize certain forms of human cognizing include inextricable tangles of feedback, feed-forward, and feed-around loops: loops that promiscuously criss-cross the boundaries of brain, body and world. The local mechanisms of mind, if this is correct, are not at all in the head. Cognition leaks out into body and world. [p.xxviii]

From which is derived the *Hypothesis of Cognitive Impartiality (HCI<sup>1</sup>)*:

Our problem-solving performances take shape according to some cost function or functions that, in the typical course of events, accord no special status or privilege to specific types of operations (motoric, perceptual, introspective) or modes of encoding (in the head or in the world). ... It states that the biological control system doesn’t care about differences of location or type of resource but simply uses whatever it can, relative to some cost-benefit trade-off, to get the job done. ... [I]t is indeed the biological brain (or perhaps some of its subsystems) that is in the driver’s seat. [p.121-2]

In short: the brain doesn’t care where thinking or, more broadly, cognitive processes occur as long as they occur, and Clark gives a lovely example of this from Richard Feynman who claims that his *working* was done on the paper on the desk in front of him. Clark adds that he “would like to go further and suggest that Feynman was actually *thinking* on the paper” [p.xxv], and it is pretty clear

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<sup>1</sup> Surely this is to be a doomed acronym in this context, forever to be confused with Human Computer Interaction!

from Feynman's own words that this was, pretty much, precisely what he meant; but it does seem rather odd to locate, even situate the cognitive action "on the paper" out there in the world, when a much more reasonable - though, admittedly, much less economical (see below) - account could be given in terms of the dynamic coupling of the affectively-saturated agent and world, through the use of virtual and concrete technologies, for realizing thoughts through different media. This story would be about the sensorimotor possibilities of thinking as doing; to paraphrase Alva Noë "[Thinking] is an activity of exploring the world making use of our practical familiarity with the ways in which our own movement drives and modulates our ... encounter with the world."<sup>2</sup> [p.]

From Clark's statement of his position we can conclude that the brain is necessary but not sufficient for cognition, though we discover from a thorough reading of the text that it would seem it is both necessary and sufficient for consciousness - but more about this later. For cognition we need to be both embodied and embedded, but the body must have soft, permeable boundaries and the world must be rich in action possibilities where agents can exercise their embodied capacities for intelligent problem-solving. Clark's theory conforms to an information-processing framework with its computationalism, but more emphatically its functionalism being presented as trumping other contending theories of the mind and most notably the enactivist thesis presented by, amongst others, Varela, Thompson & Rosch (1991) and, more recently, Alva Noë (2004 & 2009), and the "strongly sensorimotor" models of perception offered by O'Regan & Noë (2001) and Noë (2004).

There are two specific things that Clark objects to in their theories: (1) the playing down of the role of representation by suggesting that "perceptual experience gains its content and character courtesy of an agent's implicit knowledge of the ways sensory stimulation will vary as a result of movement" [p.169], and (2) the ontological commitment, or "sensorimotor chauvinism" [Clark & Toribio 2001], explicit in the claim that "to see *as we do*, you must then have a sensory organ and a body like ours" [Noë 2004, p.112; partially quoted in Clark 2008, p.205]. In response Clark claims that

... the positive story displayed in chapters 1 through 4 depicts embodied agents as benefitting from multiple forms of internal and external representation, as deploying a variety of computational transformations defined over those representations, and as apt to participate in extended functional organizations that allow cognitive processes to spread productively across brain, body, and world. [p.165]

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<sup>2</sup> It is 'seeing' not 'thinking' in the original.

However, Clark voices his concern about the polarization of, on the one hand, enactive, dynamical approaches, and on the other, computational and information-theoretic approaches, and is clear that a further aim of his text is “to reveal *computational, representational, information-theoretic, and dynamical approaches as deeply complementary elements in a mature science of the mind.*” [p.24, italics as original]. It is a rapprochement sincerely to be sought but nature is often messy and the solution might not possess the computational elegance and simplicity that Clark so admires in an account of the mind.

Elegance in the extended mind theory is presented in terms of the system’s economy, its efficiency, and how it can spread the cognitive load beyond the commonly conceived boundaries of brain and body; as he says:

The primary lessons of embodiment are thus lessons in economy, efficiency, and spreading the load. Such lessons help display the strategies of representation, computation, and control that biological brains actually instantiate and deploy, revealing us as factory tweaked and primed for all manner of cognitive shortcuts, offloadings, and extensions. It is only thanks to this heady (?) combination of processing potency and openness to extension and transformation that the human brain succeeds as this world’s most stunningly potent organ of cognitive success. [p.166]

It would be impossible not to notice some element of neurocentricity in this passage, and it is very far from being an isolated passage. Look again at the *Cognitive Impartiality* passages quoted above, and the following:

Attention to embodied, embedded, and extended cognition ... provides the essential lens through which to appreciate the startling power and elegance of the neural machinery, observed at home in its ecological setting. [p.140-1]

In fact, Clark spends such a lot of his time soothing his critics and detractors with this strong commitment to "a persisting common biological core" [p.117] that the extended mind argument begins to lose some of its sharpest teeth.

Which brings me to my first serious reservation: I am not convinced that there is anything very novel being presented here; there certainly seems to be little, if any, advance on that which we read in Clark & Chalmers 1998, though there is, of course, a lot of additional, extremely fascinating, detail which serves to ‘supersize’ the original text if not to actually ‘supersize’ the mind or the theory itself; and there is, of course, the response in Chapter 6 to Rupert’s objections that cognitive

processes lean on but do not incorporate environmental structures and scaffolds [p.111-39]. If anything Clark's insistence on the biological core as the point of origin for cognition lessens the merit of the earlier bolder position in which he (and Chalmers) asked of their readers the acceptance of some very striking ideas - ideas which, it would not be an exaggeration to claim, have influenced a generation of writers in these areas. Their ideas then included the non-neural instantiation of intentionality or dispositional beliefs – see Otto's beliefs stored and accessed in his notebook, that the notion of equipmental transparency can extend over Otto's notebook and Inga's biological memory as expressed by the *Parity Principle* – that an action be deemed cognitive whether or not it occurs in the brain, if it would be deemed cognitive if it did occur in the brain, and the conflation of vehicles and content in their being distributed across brain, body and world; the moral then, as now is that “when it comes to belief, there is nothing sacred about skull and skin.” [Clark & Chalmers 1998, p.14; Clark 2008, p.228]. Nothing has changed between texts, but the move to recentralise the role of the brain – not, let's be clear, to claim that mind and brain are co-extensive for that would be BRAINBOUND – is now much more evident and this gives the impression of reining-in a claim for a more radical mental extension or the kind of supersizing suggested in the title. Here is a passage that characterizes this backtrack:

Take 390 grams (about 14 oz.) of soft white-gray meat, tweak it, and pummel it, leaving the surface convoluted. Place in a suitable (mobility-enabled) container, and steep for a few years in human society. Let the preparation grow, roam, and mature, and watch in amazement as human thought and reason slowly emerge from the motley pot of bones, muscles, sinews, sense organs, neurons, and synapses. Mental alchemy: meat made mind ...

In this virtuoso display of cognitive unfolding, it would be madness to underplay the role of the biological brain. [p.140]

Now, with the exception of his emphasis on the central and originating role of the brain, Clark's claims for cognitive extension seem eminently reasonable, with very little - *pace* Adams & Aizawa 2001, 2008a & 2008b, Rupert 2004, Fodor 2009, and Sloman 2009, for example - with which one might be disposed to disagree.

Clark is certainly not mistaken when he says that “Biological systems ... display remarkable powers of bodily and sensory adaptability ...[being] able constantly to negotiate and renegotiate the agent-world boundary itself” [pp.33-4]. Nor is he mistaken when he says that we enhance our cognitive capacities by adapting our environment, and those enhanced capacities demand further environmental adaptation, and so on as we continue in the enhancement-adaptation loop. But when

he emphasizes the pivotal role of the ‘self’ in the adaptation of our environment, in, for example, “The cumulative complexity here is genuinely quite staggering. We do not just self-engineer better worlds to think in. ... Our mature mental routines are not merely self-engineered: they are massively, overwhelmingly, almost *unimaginably* self-engineered.” [p. 59-60], I find myself baffled by the emphasis on the self, that is, on the individual cognizing agent.

In fact Clark’s emphasis on single brains, selves, or individuals is brought centre stage in his *Hypothesis of Organism-Centered Cognition* (HOC):

Human cognitive processing (sometimes) literally extends into the environment surrounding the organism. But the organism (and within the organism, the brain/CNS) remains the core and currently the most active element. Cognition is organism centered even when it is not organism bound. [p.139]

And again when he suggests that we

... make the (surely uncontroversial) assumption that the biological brain is, currently at least, the essential core element in all episodes of individual human cognitive activity. [p.118]

In fairness I should acknowledge that Clark does mention the social world when he says that “In building our physical and social worlds, we build (or rather, we massively reconfigure) our minds and our capacities of thought and reason.” [p.xxviii], and in the paragraph that follows it he suggests that “although both the biological brain and the whole embodied organism each stand as perfectly good, and strategically crucial, units of cognitive scientific investigation ... There is ... important science emerging ... that targets ensembles of neural, bodily, and environmental elements” [ibid.]. But it is the use of ‘ensemble’ which is important here, for these ensembles are individuals that are aggregates of their neural array, their body, and their environment. The notion of environment employed here might include other agents, but only broadly and by implication; to include them explicitly could render a purely information-theoretic, computational account of the mind not just implausibly convoluted and neither economic nor elegant, but probably completely impossible.

But this concentration on the individual in organism-centered cognition is misleading and naïve, for there can be no individual, that is, no self without other. We might have a particular somatosensory

perspective and even a particular body or ‘skin-bag’ [p.xxviii], but we are not isolated individuals.<sup>3</sup> We act in the world, not as isolated selves, but as conscious, socially and culturally embedded, phenomenal agents, rich in our unique experiential histories, but also rich in our greatly distributed, complex array of felt affective relations and interrelations with other agents, entities, and things. Again, two things stand out: (1) the community and reciprocity of the action and interaction in such relations, and (2) their essential affective, felt nature.

All of our activity is grounded in the sensing, feeling active body operating in relation to other sensing, feeling active bodies (generally agents, though it is true we also interact in complex ways with objects, but discussion of this must wait for another opportunity). We are deeply and naturally kinaesthetic and enkinaesthetic, aware of our bodily movement and our action in the world, but also able to affect others and be affected by them, moving and being moved [Bråten 2007] within a reciprocal affective neuro-muscular dynamical temporal flow. The way in which these felt somatosensory relations fold and unfold – by bringing forth our world through our kinaesthetic imagination and associated somatosensory expectations – together influences how we will shape and adapt our world, how we will then adapt to those changes, and so on. These critical features of the mind and embodied, embedded, affective agential action do not appear in the account of the mind offered here.

All of which brings me to my second reservation, which is not unrelated to the first. Clark’s thesis is just too narrow. One might even describe it as ‘narrow-minded’, though that might be judged to be a little uncharitable for the engaging and thought-provoking writer that Clark clearly is. Clark might emphasize, for example, the crucial role of affective-effective feedback loops, the continuous reciprocal causation (CRC - see Clark 1997) in the organism or system’s dynamically-coupled cognitive engagement with the world, and the intricate interweaving of brain, body and world, but his notion of the mind is limited to an information-theoretic, functionalism-compatible account of cognition, with a very narrow conception of what constitutes the mind – cognition only, not consciousness and certainly not the phenomenological aspects of experience. However, in fairness, I must say that there is a brief mention of the phenomenological character of alienation that one experiences when using some software with which one has not yet become familiar, which has not yet become transparent equipment, but we are all too soon - after only a single paragraph - back to the information flow, not the experiential flow, but an information flow that apparently

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<sup>3</sup> “No man is an island, entire of itself; every man is a piece of the continent, a part of the main.” John Donne, *Meditation XVII* This is simply too beautiful not to quote, if only in full were possible.

characterizes fluent integrated activity. But the information flow is not experience, and the experience of fluent integrated activity is characterized by its nuanced affective tonalities, not its computational ones. Even an utterly complete information-theoretic account with the potential for, not only multiple, but exhaustive possible realisability, will not yield anything even faintly resembling the kinaesthetic subtleties that characterize and underpin the givenness of the conscious organism's experience as it moves and acts within a community of other agents and objects within its world.

The fundamental point is really that when Clark uses the term 'mind' he refers only to cognition and its associated cognitive processes, and not to the full gamut of experience with its conscious aspect and phenomenological character which, quite assuredly and I agree, not all cognitive processes possess. Since this is the case Clark's theory of mind with its extended cognition hypothesis must be divorced from any theory of consciousness, otherwise if cognition and consciousness must be considered together and cognition is extended, then consciousness must be also, and that would be a very much more difficult position to defend and not one with which he would be at all sympathetic. As Chalmers asks in his Foreword to the book:

But then, what about the big question: extended consciousness? The dispositional beliefs, cognitive processes, perceptual mechanisms, and moods considered ... all extend beyond the borders of consciousness, and it is plausible that it is precisely the nonconscious part of them that is extended. [p.xiv]

and as Clark and Chalmers, and Clark continue

It is widely accepted that all sorts of processes beyond the borders of consciousness play a crucial role in cognitive processing: in the retrieval of memories, linguistic processes, and skill acquisition, for example. So the mere fact that external processes are external where consciousness is internal is no reason to deny that those processes are cognitive. [Clark & Chalmers 1998, p.10 and Clark 2008, p.224]

Apart from the immediate concerns one might have with the notion of the 'borders' of consciousness in these passages, especially when you consider the complex mesh of conscious dialogical affective relations in which we routinely exist and through which our minds, and not just our narrow-minds, are distributed, one might also be led to conclude that consciousness is

epiphenomenal for Clark for all the role it plays in his conception of the mind.<sup>4</sup> If the mind is truly to be supersized, it must contain all its aspects: its phenomenology, its consciousness, the deeply felt, and essentially social, enkinaesthetic dialogical relations, the lot; but that, being incompatible with an information-theoretic account, makes it a giant leap too far for Clark. Perhaps it really is just as he admits in the final sentence of Chapter 10 that, “Seen aright, our mashup minds are just mindsized after all.” [p. 219], and that’s about right for a rather narrow mind.

So, now let me come to some of those ancillary points I mentioned earlier.

In the opening paragraph of Chapter Three, “Material Symbols”, Clark describes language “as a form of mind-transforming cognitive scaffolding: a persisting, though never stationary, symbolic edifice whose critical role in promoting thought and reason remains surprisingly ill understood” [p. 44]. Once more there are two things which stand out in this quotation. The first is Clark’s easy fluency and rhetorical skill. He is such an adept and engaging writer that he may not even notice when he puts together words like ‘edifice’, ‘scaffolding’ and ‘structure’ (the latter from the composite “linguistic structure”), writing persuasively to slide the idea subliminally past the reader’s notice and in to their repertoire of thoughts. The second and much more significant point is that, perhaps part of the reason language is still so ‘ill understood’ is because of the false premise that it is a symbolic edifice consisting of material symbols; and the notions of ‘edifice’ and ‘scaffolding’ are exactly the sorts of words that underpin this erroneous claim for materiality.

To be honest, I am not really sure what it means for language to consist of material symbols that when put together constitute a symbolic edifice. In its use in speaking, typing, and writing, language is not material and, even though it has parts which can be arranged and rearranged to express new thoughts, it is only in some abstract metaphorical sense that it is used to build walls and borders and other structures. To think of the parts literally as ‘building blocks’ with which material symbolic edifices can be built seems just too unlikely to be the case.

And then there’s the role of the body and the necessity of dialogical relations in communication that, with the exception of a splendid section on gesture [p.122-37], is not just overlooked but disregarded completely. Language is something we do, it is an activity and, as with gesture, it requires a plurality of participants and an abundance of interactivity. It operates on a social and cognitive level, and also on a physical level involving more than just the vocal chords and associated vocal tract. Communication, or languaging in this context, isn’t just about the shifting

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<sup>4</sup> Perhaps Chalmers, almost infamous for his epiphenomenalist stance and his claim that the are neural correlates for consciousness [Chalmers 1996 & 2000], has had a much greater influence than has otherwise been acknowledged!

and rearrangement of symbols, it is about bodies-in-interaction acting on and altering one another and their worlds through the reciprocal, community-based dialogically-coordinated attunement and the transformation of feelings; once again, it is about moving and being moved.<sup>5</sup> It is these enkinaesthetic dialogical relations with their preconceptual experientially-circular temporal dynamics which form the deep extended melodies of relationships-in-time, and not the manipulation of putative material symbols.

Finally, and on a much lighter note, Clark's language may be rhetorically sophisticated but - and he might be horrified by my saying this - it is also often characterized by a sort of corporate machismo.<sup>6</sup> Take, for example, the following quotations:

From the perspective of the HEC, the ancient biological skinbag is the handy container of persisting recruitment processes and of a batch of core data, information, and body-involving skills. Thus equipped, the mobile human organism is revealed as a kind of walking BIOS, ever ready to bootstrap into existence the larger soft-assembled cognitive systems that are, quite literally, the information-processing engines of much advanced thought and reason. [p.138]

It is the brain's great plasticity and thirst for cheap, outsourced labor that drives the distributed engines of sociotechnological adaptation and change. It is true, too, that by subtracting those meaty islands of wet organismic plasticity, the whole process grinds to a standstill. [p.162]

[We are] factory tweaked and primed..." [p.166]

All of these make the old skinbag sound like a rapacious American firm moving the factory south to Mexico!<sup>7</sup>

There is no doubt that Andy Clark has produced another fascinating read in *Supersizing the Mind*. Whilst it may not succeed in supersizing the mind, it is an exciting and provocative book, and one I recommend wholeheartedly to anyone even remotely interested in the functioning of cognitive processes, extended or otherwise.

## **Bibliography**

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<sup>5</sup> Anyone who has every watch *Buffy the Vampire Slayer* will know the transformative effect on the affective state of the female viewer of Spike's head tilt. No words, no material symbols, just a bodies-in-interaction, transformative moment.

<sup>6</sup> It might also be that I am now sadly out of date on the language of information theory!

<sup>7</sup> Thanks to Stephen Dougherty for this lovely phrasing.

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