

***Reclaiming Cognition – The Primacy of Action, Intention and Emotion.* Edited by Rafael Núñez and Walter J. Freeman (Imprint Academic, Thorverton, UK, 1999), 284pp., ISBN 0907845061 (paperback), £19.90.**

The body is back

In spite of its status as a new comer in the history of ideas, cognitive science has already shown severe symptoms of theoretical obduracy. For the same reason, many have long since given up on it as a serious candidate to help out in the philosophical effort of describing human nature. Now it seems however, as if there is light ahead and cognitive science will finally show its full strength.

Fortunately the rescue comes from within as a growing suspicion about the ‘cognitive revolution’ being not originally quite as revolutionary as it is now advocated thought, but just ‘old wine in new bottles’. In other words, as spring cleaning has begun in the cognitive community. Out goes much of the inherited rationalistic, intellectualistic and transcendentalistic goods, and biological, contextual, physiological, dynamical and action-based models of descriptions replace them. Models that on the one hand make the description of cognition a much more complex enterprise, but at the other hand seem as an almost trivial pointing to the concrete setting of cognition.

This book (also published as a special issue of the *Journal of Consciousness Studies*, 6, 11–12) is devoted to this new tendency, which goes under different names such as ‘New AI’, ‘Nouvelle AI’, ‘Embodied Cognition’ and ‘Situated Cognitive Science’, ‘Interactivism’ and ‘Enactivism’. To proclaim the tendency as new is perhaps a bit of an isomorphism. Various critical voices, Hubert Dreyfus, John Searle and Rodney Brooks being probably the most prominent among these, have since decades attacked the ‘faith’ in cognitive science – the so-called ‘cognitivism’ – but it has hitherto not had the same wide spread support as now. The term ‘cognitivism’ (not to be confused with the homonymous antagonist to scepticism) covers a range of more or less implicit assumptions about the nature, foundation and status of cognition. Assumptions that Hobbes, Descartes and Leibniz, in their respective ways, have sowed the seeds for (and many before them prepared the ground for). More specifically you find the mechanistic materialism of Hobbes, the notorious dualism of Descartes, and the calculational rationalism of Leibniz, if you investigate the *credos* of cognitivism.

Cognition is believed to be rational, formal, non-emotional, a-temporal, disembodied, isolated from context and independent of biological factors such as phylogeny, ontogeny and epigenesis. For cognitivists cognition is processes of manipulation of symbols on an arbitrary substrate (functionalistic dualism). The symbols themselves are semantic quantities representing a feature of the world, which are fed into the system from a memory or directly as input from outside the system, and then get modified according to formal syntactic rules on the central assembly – by Dennett named the ‘Cartesian theatre’. Thinking takes place in many separate modular units, each of which take care of a single functional aspect of cognition. Likewise cognition is rigidly divided into sensing – thinking – action sequences. And due to the history of cognitive science as a challenge to behaviourism, the middle part – the transition of input to output that takes place inside the black box – is accentuated as the most (only) important part.

Cognitivism does not only seem baroque, but has also been severely discredited by most recent empirical studies such as ethology, cognitive science and robotics. Besides, an acknowledgement of the highly plausible stories about the evolutionary rise of cognition, makes it nonsensical to ignore the body and other concrete aspects of our setting. Cognition, as a biological category, serves the maintenance and reproduction of the organism and it must be studied as such. Hence the investigations of cognition have to deal with both the ‘how’ and the ‘why’ of cognitive functions, and that is primarily in the etiological sense – show and why it came to be that specific cognitive architectures have arisen in different organisms. As opposed to the top-down functionalistic approach of cognitivism, the immensely harder enterprise of detecting every constituent part from a global analytical view forces us to try a more diachronic and bottom-up perspective on the organisation of cognition. The body is not a machine whose purpose it is to carry around our golden reason. Our mental sphere is possibly just a banal part of the organism’s toolbox, which is perhaps biologically peculiar but doesn’t deserve a separate ontology. In the same manner as nobody gets tempted to metaphysical excesses because of the catching reflex of the hand.

Even though the (re-)emergence of connectionism and neural networks in the mid-1980s tried to pull the research toward more physiologically plausible models, some of the cognitivist principles stuck, e.g. the idea that cognition is computation and manipulation of representations. Despite structural and organisational similarities with the brain, with a vast number of simple but highly interconnected computational

nodes, neural networks are still the expression of old epistemological prejudices. Cognition is modelled as an 'inside' confronted with an abstract 'outside', and still in most cases just a matter of transforming input to output. Neural networks are *disembodied* and thus deprived of the opportunity of meaningfully interacting with the environment as the result of a development of structural coupling. The progress of connectionism does bring along however, compared to the symbol processing approach, is the self-organisation manifested by the cognitive system and the idea of distributed encoding. In combination with the robustness, the functional capabilities in noisy environments and the learning capacity of neural networks, this model is an important tool in the search for viable artificial cognitive architectures. But a little progress can be a major setback, if we allow ourselves to maintain a view of cognition as polarised and solely based on encoding.

The reader has to excuse my coarse descriptions of cognitivism and connectionism, but the trivial fact that we are fundamentally biological beings is still highly controversial after millennia of metaphysical slavery first under a Platonic and later a Cartesian hegemony. Such a powerful opponent, which gets its force from its implicit status in most of our thinking, calls for proper resistance. Hence, efforts towards a 'metaphysical deconstruction' and a challenge to the obviousness of 'lex intellectualis' are salient in the historical reviews offered by some of the seventeen contributions in this book.

The new tendency does not make up one homogenous group (that is why I do not call it a paradigm); some of its core concepts have become almost vacuous buzzwords and thus a lot of half-hearted followers. Rafael Núñez in his contribution divides the approach into three levels of commitment (pp. 55-57):

- 1) *Trivialembodiment*. Cognition rests on physiological and neurological processes, and it is related to biological structures. Cognition should not be studied without consideration for its neurological foundation.
- 2) *Materialembodiment*: The acknowledgement of the physiological and neurological basis of cognition must develop into a systematic treatment of these processes in cognitive science. Since cognition is distributed and complex, the description has to be temporally, neurologically and contextually concrete and adequate. Cognition does not just take place within a context, but the context is an intrinsic element of cognitive

processes. Material embodiment focuses typically on low-level and local cognitions such as the catching of the hand or perception.

- 3) *Full embodiment*: The perspective extends the embodiment 'all the way up', so all cognition –including abstract thinking –is based on and influenced by embodiment. For example, mediated by body-based metaphors and conceptualisations.

In addition to these three levels of commitment there are various different methodological and theoretical perspectives. Some take the embodiment to relate to all kinds of agents –whether artificial or natural –that act dependent on a given context. For other embodiment denotes an explicit challenge to representationalism and computationalism, with a shift to new models of descriptions such as non-linear and dynamic models. Others again accentuate the phenomenological level of the living body as essential for an understanding of cognition. Núñez himself pleads for a synthetic approach: “an non-computational view that emphasizes the primacy of the organization of the living and the resulting bodily experience it sustains” (Ibid.)

Andy Clark makes an attempt in his contribution to synthesize reductionistic perspectives, which minutely focus on local micro-systems, and holistic perspectives that focus on the overall adaptive behaviour of an organism. This effort towards descriptonal synthesis is very important if the new tendency shall not end up in 'level-of-description-chauvinism' and repeat the dualist fallacy. In fact considerations about descriptive stances as well as heuristics and the general theoretical foundations for the use of concepts like 'self-organisation', 'emergence' and 'complex dynamics' will have to play a major part in the maturation of the new cognitive perspective.

The Canadian physiologist Paul Cisek argues for an anti-computationalism by claiming that computer models for cognition cannot explain 1) why cognitive abilities arise, and 2) where semantic content stems from. Cisek continues by saying that it is not the purpose of cognition to result in the right *action*, but to make sure that the action delivers the right *input* (feedback control). The difference seems small but it is biologically vast, since it fundamentally ends cognition with motivation and value. The organism has a great deal of interest in the subsequent input (security vs. predator, empty vs. full stomach), whereas the output –the action –is not of interest *per se*. The computer, on the contrary, does not care about the input (or the output for

that matter). It just functions or not and has merely been designed to give the right output.

This description also points to how meaning arises. Meaning is the “affordance” (with a term borrowed from J.J. Gibson) by invariant relevant features of the environment that supports a specific action for the organism, and thereby offers control over the resulting input: “the ‘meaning of an object’ is secondary to the meaning of the actions which the object makes possible” (p. 136). The hole has meaning for the mouse as ‘shelter’ and for the cat as ‘potential source of food’. In the same manner representations acquire meaning by contributing to the control of actions. For example of an arm: “these representations do not require meaning to be somehow assigned to them; their meaning is their role in the behavioural control of the arm” (Ibid.). The controlling action (the motor control of the arm) is both temporally and semantically prior to the representation. Hence cognition is not primarily representational and computational. Besides, the separation of action and cognition is not cognitively legitimate. For example the testing for endurance confers the ice with meaning (supportive or not). Action is tightly coupled with cognition in various functional circles. Cisek offers a pedagogical analogy as to why the brain does not primarily make input-output processes. The *raison d’être* of a car, he says, is not the transformation of chemical energy into kinetic energy, and the brain’s job is not to process information. The brain is an organ for control (and the car a vehicle for transportation), which interacts with the environment in feedback loops, to achieve the right input.

The great importance of emotions for cognition is also well documented, especially in the work of Antonio Damasio. However, the tight relation between emotions and movement is not quite as well known, and that is the subject of the interesting contribution by Maxine Sheets-Johnstone. Emotion is at its very root motivation for movements she claims. Etymologically terms as ‘emotion’, ‘motion’, ‘motive’ and ‘motivation’ are closely related as in phrases like ‘they were moved by her speech’. According to Sheets-Johnstone the relation is very tight: “What is kinetic is affective, or potentially affective; by the same qualitative measure, what is affective is kinetic, or potentially kinetic” (p. 259). Different studies have demonstrated both generative and expressive bonds between motion and emotion. In some experiments, subjects reported difficulties in imitating certain emotions if fixated in an opposite bodily

exposure. For example the feeling of lightness and happiness is fixated in a closed exposure or sadness is fixated in an open 'x' -exposure: "emotional behaviours are fundamentally kinetic bodily happenings that originate in experiences of being moved to move and that evolve kinetically" (p.273). Since emotions are states of bodily readiness to do some kind of actions it is not possible to attain certain emotional states if the readiness is not present. The communicative aspects of emotions are thus secondary to the motivating and we probably only show interest in the emotional states of our fellow creatures due to the consequences (actions) they might have.

The moral according to Sheets-Johnstone is that investigations of cognition must begin with the fact that we are fundamentally living and animate beings and start to give more attention to phenomenological methods. Animation is not the same as output behaviour. What we fear in death is not the loss of computational skills, but the absence of the ability to be moved to movement -to be un-animate. She also notes that we will have to be careful with our use of concepts like 'embodiment', since they can be contaminated with dualism. That reveals itself in tautological usages as 'embodied agents' and 'embodied actions'. A tendency that is unfortunately widespread.

In spite of the great differences in perspective and quality of the contributions, *Reclaiming Cognition* offers fruitful reading for everyone with a specific interest in the field or anybody just curious about recent developments in cognitive science. The growing focus on the non-intellectualistic parts of cognition is timely and sound. I fully agree with Andy Clark though, that we have to be aware not to commit the classical crime and just take the opposite extreme and end up in militant concretism. I am confident, however, that this shift in cognitive science will be an important voice in the song about human nature in the years to come. So even though cognitive science is an upstart in philosophical terms, I find it an obvious prince for the epistemological throne.

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