Technical artefacts and perceptual experience

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The basic scheme for considering enaction is the dynamic sensory-motor coupling between an organism and its environment. The sensory inputs are used to guide the actions; the actions modify the environment and/or the relation of the organism to its environment, and hence modify in return the sensory input. This basic scheme applies already to animals. In the 1920's the German ethologist von Uexküll [von Uexküll, 1966] characterized animal worlds (for example, the "world of the tick") on the basis of sensori-motor contingencies as they function in ecological context.

What the world "is" for the organism amounts to neither more nor less than the consequences of its actions for its sensory inputs – what [O'Regan and Noe, 2001] call the sensori-motor contingencies; and this in turn clearly depends on the repertoire of possible actions. Without action, there is no "world", and no perception.

There is a deep affinity between this approach, the enactive approach of [Varela, 1991], and the ecological psychology of Gibson according to which perception is not a matter of computational representation, but rather a direct perception of affordances [→ Affordances], i.e. potential actions as such. This affinity lies, as we understand it, (a) in the fact that all of them assume a non-representationalist framework, and (b) in the fact that Gibsonian rules, laws of control [→ Control, laws of] [Warren, 1988], contingencies [→ Sensorimotor contingency or dependency] [O'Regan and Noe, 2001], all of them are not pre-given but emerge from the interaction between an organism and its environment.

For the purposes of this text, we are not going any further in the description of (discrepancies between) these approaches, we rather propose to consider what is specific to human beings: technical artefacts.

One of the major characteristics of human worlds is that the sensory-motor coupling is mediated by technical artefacts. For animals, the sensory organs and the motor organs are fixed (within any given species), and they are attached to the body. For humans, the mediation of sensory-motor coupling by technical artefacts introduces two radical innovations.

Firstly, the range of possible sensory inputs and the repertoire of possible actions is greatly increased, without any limits other than the invention and fabrication of new artefacts. This is clear for the new possibilities of action which are created by tools, from hammers and screwdrivers to power-tools of many sorts. It is also clear for instruments – microscopes, telescopes, microphones, infra-red detectors, radios and so on resulting in sensory inputs which are strictly impossible without the devices in question. An interesting special case is the sensory substitution devices [Lenay, 1997]. More generally, but less obviously, technical artefacts *organize* sensory experience: think of the world of skier, which is impossible without the artefact. Even when we are not actually skiing, our perception of the mountain is determined by the possibility (i.e. virtual action) of skiing and the correlative sensations. So this first point can be understood more profoundly: in case of contemporary humans, there hardly any "natural" perceptions or relations to the world: our sensory-motor coupling is always fashioned, at least virtually, by technical artefacts [Khatchatourov, 2005].

Secondly, technical artefacts are not irremediably fixed to the body. More precisely, technical artefacts exist in two modes: in hand and put down. When a technical artefact is in hand, being used, it becomes a prosthetic extension of the body; correlatively, the artefact disappears from consciousness, and the attention of the human subject is focussed on the "world" that comes about (think again of the "world of the skier", for example). Artefacts, like the body, are normally transparent [Merleau-Ponty, 1945] to the subject; as [Heidegger, 1996] has pointed out, they are only noticed when they are dysfunctional (a wobbly hammer or a twisted ankle). However, unlike biological organs, technical artefacts can also be "put down": separated from the body, they can now become objects of attention. In this mode, their objective physical proprieties can be perceived; they can be invented, fabricated, repaired and so on [Lenay & Sebbah, 2001]. The whole question of learning can be seen as the back-and-forth movement between these two modes. This explains also the radical innovative potential of technical artefacts. Over several thousand years, and at an ever-increasing rate, technical innovation has radically transformed what the world is for human beings.

References

[Heidegger, 1996] Heidegger, M., Being and Time, State University of New York Press, 1996.

[Khatchatourov, 2005] Khatchatourov, A et Auvray, M. L'outil modifie-t-il la perception ou la rend-il possible ? *In* Actes du Ve Colloque Jeunes Chercheurs en Sciences Cognitives, Paris, 2003; and revue Arob@se, www.univ-rouen.fr/arobase, 2005.

[Lenay, 1997] Lenay, C. et al., Technology and Perception: the Contribution of Sensory Substitution Systems. In *Second International Conference on Cognitive Technology, Aizu, Japan*, Los Alamitos: IEEE, 1997, pp. 44-53.

[Lenay & Sebbah, 2001] Lenay C., Sebbah F., La constitution de la perception spatiale. Approches phénoménologique et expérimentale. in Intellectica, n°32, 2001/1

[Merleau-Ponty, 1945] Merleau-Ponty. Phenoménologie de la perception. Gallimard, Paris, 1945.

[O'Regan and Noe, 2001] O'Regan K.J. and Noë A., "A sensorimotor account of vision and visual conciousness." In *Behavioural and Brain Sciences* 24, 2001, pp. 5-115.

[Varela, 1991] Varela F., Thompson E. & Rosch E. *The Embodied Mind*. MIT Press, Boston, 1991.

[von Uexküll, 1966] von Uexküll J.V., *Mondes animaux et monde humain*. Gonthier, Paris, 1966.

[Warren, 1988] Warren, W. H., "Action modes and laws of control for the visual guidance of action." In O. G. Meijer & K. Roth (Eds.), Complex movement behaviour: The motor-action controversy. Amsterdam: North Holland. 1988, pp. 339-380.

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