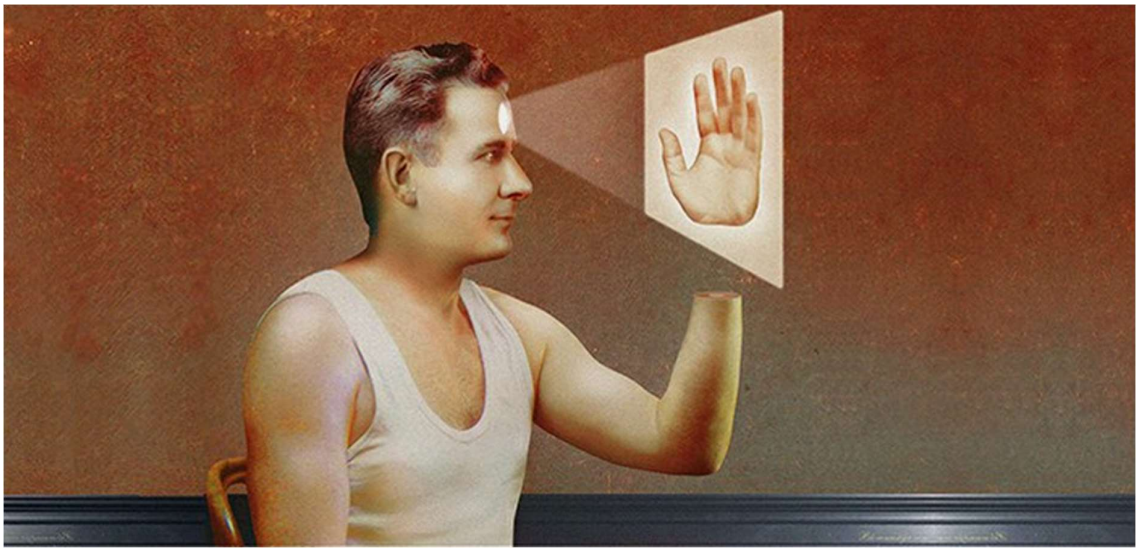
Affordances and Phantom Limbs



James J. Gibson's ecological psychology attempts to bridge a gap in the science of perception. He aimed to include the semantic qualities of perceived objects in his account of how their perception. Traditionally, objects are conceived of being devoid of meaning when perceived, it is only after some mental representation is produced of the light which reflects off the surface of the object, through the retina to the visual cortex, and back to the frontal cortex again that we can then find meaning in things. Gibson refuted this notion however, stating:

> *"There is a need to study the perception of surfaces with a realistic attitude as well as a phenomenological attitude."* (Gibson, 1979, p.112)

He coined the term *affordance* to incorporate in the definition of the object the potential subjective meaning it possesses for its perceiver. Affordances can thus be described as the meaningful properties of objects as they relate to an individual observer. They are a compound of objective and subjective features as such, dependent on both environmental facts, e.g., a table having four legs and a flat surface on top; and subjective meaningful properties, e.g., a table presenting the possibility of being a suitable place to study for a student. The objective properties must always be relational to the perceiver, aligning with their idiosyncratic properties like body-scaling and their circumstantial facts, e.g., for a young child this same table simply affords somewhere to eat. Affordances are then ontological amalgams, neither objective nor subjective but both simultaneously.

In his article 'Affordances and the Body', Heft draws a similarity between Gibson's definition of affordances, and Merleau-Ponty's phenomenological approach to perception. Both wish to reinvigorate objects with a semantic quality that is exhibited to the perceiver when the object is seen. So, every object presents myriad potential means of utilizing or engaging with it to the individual, but crucially:

> *"Which particular affordances are utilized in a given environmental setting will intend on intentional processes of the perceiver". (*Heft, 2007, p.10)

As such, the physical determinants of the individual (height, weight, length of reach, etc.) in tandem with their goal orientations elicit particularly salient affordances within objects to match their aims

and abilities. Conversely, the affordances of the objects can also constrain the intentional actions of the individual. This definition thus encompasses subject and object to allow for an open and living system within which relations are always relative and meaning intrinsic. Affordances can then increase given the growth of the body of, or new skill acquisition by the perceiver, and crucially, they can also decrease given maturation, cognitive decline, or injury, and so on.

> *"Loss of function, or of intentional possibilities… also results in changes in the possibility of realizing particular affordances. For example, in the case of some disabilities, stairs may no longer afford locomotion, but instead signify an obstacle. As the intentional capacities of an individual change, the affordances of the environment change concurrently." (*Heft, 2007, p.19)

This view is abundantly evident in Merleau-Ponty who sees perception as an intentional project, one in which what is given by the objective world arrives pre-coloured by the perceiver's goals. This becomes clear with his treatment of phantom limb cases. Phantom limbs are the experience of an absent limb by a patient and occur in more than 60% of all amputations. They can be excruciatingly painful, and if caused from an injury can retain the original position of the limb and maintain the same intensity and quality of pain as at the time of the incident (*cf.* Merleau-Ponty, 2005, p. 87-88).

Interestingly, Merleau-Ponty realized that the psychology and physiology of his day were insufficient in their explanation of phantom limbs. They focused solely on mechanistic explanations and seemingly ignored the fact that the patient was still a living person in an environment littered with objects that afforded particular possibilities to them, it is being-in-the-world. He thus refuted the physiological account that a phantom limb should be treated as a residual part of a representation of the body which is no longer relevant (what today is called an engram in this kind of research). So too did he reject the psychological account that the phantom limb is a memory. He instead favours an approach that emphasizes the body schema and the affordances of objects:

> *"To have a phantom arm is to remain open to all the actions of which the arm alone is capable; it is to retain the practical field which one enjoyed before mutilation. The body is the vehicle of being in the world and, and having a body is, for a living creature, to be intervolved in a definite environment…"* (Merleau-Ponty, 2005, p.94)

This phenomenological and ecological perspective is hit home by the efficacy of Mirror Box therapy on treating phantom limb pain. This form of therapy utilizes mirrors to trick the brain into thinking that the missing limb is present. If the patient has a phantom left hand which is excruciatingly clasped like a claw after surgery, one that that will not relax, by using the mirror and their right hand they can satisfy their body schematization, adding the visual stimulus that was lacking from their proprioceptive sense of the phantom limb. Thus, by clasping their right hand and relaxing it repeatedly, they can alleviate their pain and unclasp the phantom hand. In terms of affordances, mirror box therapy is so successful because the patient will struggle greatly to adjust to their new circumstances while still in pain. How does one learn to ignore a phantom limb that feels like its burning and lacerated continuously? By alleviating this chronic pain, the patients can come to adjust to their capacities post-amputation and gradually begin to adapt the affordances found in objects with their changing bodily properties and intentions.

REFERENCES

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