

# Chapter 1

## Space, Perception, Action

### ABSTRACT

*This paper focuses on the concept of action and on the reversal of the process of perception-action operated by the phenomenological tradition (Merleau-Ponty), which has been confirmed in more or less recent neuroscientific evidences (Berthoz, Decety, Jeannerod). The text presents a quick historical overview on the concepts of space, perception, action, introducing the concept of Umwelt. The umwelt is, a dynamic, interactive concept that defines the relations between the physical world and living organisms, and constitutes the basis and the assumption of intersubjectivity. The subject builds up his world in accordance with his basic necessities and his tools of action. The chapter introduces the perspective of Alain Berthoz, who proposes a vision in which the subject navigates in his own umwelt led by a series of simplifying principles that optimize the process of perception - action and minimize the need for computation. This is coherent with the vision of Gell-Mann, according to whom an adaptive complex system (such as, for example, a living being) receives a data stream, and identifies the perceived regularity in the data stream, compresses their description in a schema, and then uses this schema for the description, the prediction or the action. According to this idea, the body in action resolves complexity in a process of perception-action which is reversed with respect to the cognitivist paradigm: “what happens in perception can be understood in terms of action”.*

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## THINKING SPACE

*Questioning the nature of space, on the relationship between space and time (and on connected paradoxes) is in the DNA of Western culture since the time of Zeno.*

*What is space? What is time? Do they exist independently of the things and processes in them? Or is their existence parasitic on these things and processes? Are they like a canvas onto which an artist paints; they exist whether or not the artist paints on them? Or are they akin to parenthood; there is no parenthood until there are parents and children? That is, is there no space and time until there are things with spatial properties and processes with temporal durations? These questions have long been debated and continue to be debated. (Norton, 2004)*

DiSalle, in *Understanding time-space*, indicates how the recent reflection on space constitutes a fil rouge, the continued debate from Newton to Einstein:

*When Newton appeals to absolute space, he does not advance any theses about the ontology of space-time. Rather the postulation of absolute space and time is inspired by empirical reasoning about motion. This theme unites Newton with later physicists: At the very least, we can identify a common metaphysical principle uniting general relativity with special relativity and Newton's theory: space-time is an objective geometrical structure that expresses itself in the phenomena of motion. (DiSalle, 2006)*

The philosophical debate on the ontology of space, in a nutshell, was hinged on two specular positions: an idea of absolute space, according to which space and time exist independently from the objects and object relations (or, more radically, according to which space and time exist), and an idea of relative space, according to which that the existence of space and time is linked to the objects and relationships between objects (or, more radically, according to which space and time do not exist) (DiSalle, 2006).

The Kantian position, that saw space and time as a priori frameworks, was the subject of further analysis of Poincare and Einstein, and grossed, as we shall see, the criticism of Piaget.

For Kant:

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