Chapter 7
Abduction in Human and Logical Agents
Hasty Generalizers, Hybrid Abducters, Fallacies

After having illustrated in the previous chapters the main features of my cognitive-epistemological analysis of abduction, it is necessary to further stress the dynamics involved in the interplay between internal and external representations in the case of logic. This will provide a tool for exploring the relationship between human and logical agents in section 7.1. First of all I will further develop my distinction between creative and mimetic artifacts. As I explained in chapter three these artifacts play the role of external objects (representations) active in what I have called disembodiment of mind. Mimetic external representations mirror concepts and problems that are already represented in the brain and need to be enhanced, solved, further complicated, etc. so they can sometimes creatively give rise to new concepts and meanings. From this perspective the expansion of the minds is, in the meantime, a continuous process of disembodiment of the minds themselves into the material world around them so that the evolution of the minds is inextricably linked with the evolution of many kinds of large, integrated, material cognitive systems. This chapter illustrates some features of this extraordinary interplay by focusing on the construction of *logical cognitive systems* and its consequences for abductive reasoning.

I will exploit the so-called *agent-based reasoning* framework, which adopts the perspective of a cognitive agent, that can naturalistically be seen in the perspective of the role of manipulations and of the interplay between internal – neural – representations and external ones, where both the conscious and unconscious are at work. I acknowledge that intellectual artifacts like *logical agents* are “ideal” tools for thoughts, as is language, they are tools for exploring, expanding, and manipulating our own minds. Logical systems can be considered mimetic, in the sense of the “mimetic representations” I have introduced in the previous chapters, (an example being that nonmonotonic systems seem to “mime” human reasoning performances better than classical logic – they are more psychologically adequate). However, they can be seen as creative when some “new ways of inferring” performed by the biological human agents arise in an unexpected and distributed interplay between brains (and their internal representations) and external representations which then leads to the creation of new ideal logical systems. I call this process – creative – externalization in “demonstrative environments” (section 7.3): I argue that it is central to the
creation of logical models of abduction, such as externalization in objective logical systems, it is communicable and sharable and able to grant stable perspectives endowed with symbolic, abstract, and rigorous cognitive features.

The proposed perspective allows us to see that deductive reasoning also means the employment of logical rules in a heuristic manner, maintaining the truth-preserving character. Application of the rules is organized in such a way that one particular course of action can be recommended over another one. Consequently, very often the heuristic procedures of deductive reasoning are themselves performed by means of “in-formal” abductions, which often show model-based aspects. I illustrate this topic taking advantage of some classical research by Hintikka and his collaborators concerning the analysis of the so-called “singular terms” and of the Kantian idea of “construction” in logical and geometrical thinking. The distinction between strategic and definitory rules is also introduced, giving further insight into abductive cognition.

As already described in chapter three (section 3.6.2) epistemic actions in the environment often “mediate” the formation of new meanings. This framework also provides a useful perspective when studying the role of externalization of the mind in producing logical representations and a better understanding of the distinction between human (practical) and ideal (theoretical, or institutional) logical agents. I further stress how demonstrative ideal systems can be described not only in terms of symbolic, abstract, and rigorous terms, but also as endowed with what I call a maximization of memorylessness. The example of logic programs as ideal agents will be addressed, which is particularly useful in demonstrating their main epistemological difference with respect to the classical logical systems. Logic programs opened up a new perspective on the logic of abduction, in which sensitivity to the growth of information [and the suitable extension of logical language] is fundamental. It is considered fundamental to the whole logic itself by some contemporary logicians.

The close relation between fallacies and abduction will also be studied. As regards classical logic (and informal logic) abduction and inductive reasoning can be defined as fallacious. I will describe how in agent-based reasoning these and other kinds of the so-called fallacious reasoning can in some cases be redefined and considered as a good way of reasoning. In the light of the agent-based framework the fallacious character of abduction and induction can be clarified: abduction, that in chapter one was described in terms of the well-known fallacy of affirming the consequent, will be recognized – in the extended agent-based perspective – as very precious method of explanation and discovery in science and in everyday reasoning. Similarly, bad inductions – hasty generalizations – will be studied both from the perspective of their possible fallacious character and regarding their usefulness in reasoning. What has been called manipulative abduction in the previous chapters will be re-interpreted as a form of practical reasoning, a better understanding of which can furnish a description of human beings as hybrid reasoners in so far they are users of ideal (logical) and computational agents. I think that the issue could invite further research on the role played by symbolism, abstractness, and rigor, regarding their capacity to characterize externalized demonstrative systems.