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The Eco-Cognitive Model of Abduction (EC-Model)
Is Abduction Really Ignorance-Preserving?

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Abstract

From the logical point of view, abduction is a procedure in which something that lacks classical explanatory epistemic virtue can be accepted because it has virtue of another kind: the GW-Model contends that abduction presents an *ignorance-preserving* or (ignorance-mitigating) character. From this perspective abductive reasoning is a *response* to an ignorance-problem. Is abduction really ignorance-preserving? To better answer this question I will take advantage of my *eco-cognitive model* (EC-model) of abduction. It will be illustrated, also thanks to cognitive and epistemological considerations, that through abduction, knowledge can be enhanced, even when abduction is not considered an inference to the best explanation in the classical sense of the expression, that is an inference necessarily characterized by an empirical evaluation phase.

Keywords: Abduction; Ignorance Preservation; GW-Schema; EC-Model.

The GW-Schema and Abduction as Ignorance-Preserving

As I have illustrated in my book on abductive cognition, (Magnani, 2009, chapter two) following Gabbay and Woods' GW-model formal schema of abduction, it is clear that "[...] abduction is a procedure in which something that lacks epistemic virtue is accepted because it has virtue of another kind" (Gabbay & Woods, 2005, p. 62). Abduction (basically seen as a *scant-resource* strategy, which proceeds in absence of knowledge) presents an *ignorance-preserving* (or, better, an *ignorance mitigating*) character. It does not have to be considered the "solution" of an ignorance problem, but rather a response to it, in which the agent reaches "presumptive" attainment rather than actual attainment. It is important to note that in order to solve a problem it is not necessary that an agent actually conjectures a hypothesis, but it is necessary that she states that the hypothesis is *worthy of conjecture*.

In the framework of the above GW-Schema it cannot be said that testability is intrinsic to abduction, such as it is instead maintained in the case of some passages of Peirce's writings. This activity of testing, which in turn involves degrees of risk proportioned to the strength of the conjecture, is strictly cognitive/epistemic and inductive (as Peirce called it) in itself, for example an experimental test, and it is an intermediate step to release the abduced hypothesis for inferential work in the domain of enquiry within which the ignorance-problem arose in the first place. It is clear that in the framework of the GW-Schema the inference to the best explanation – if considered as a truth conferring achievement justified by the empirical approval – cannot be a case of abduction, because abductive inference is constitutively ignorance-preserving. In this perspective the inference to the best expla-

nation involves the generalizing and evaluating role of induction. Of course it can be said that the requests of originary thinking are related to the depth of the abducer's ignorance.

The Eco-Cognitive Model of Abduction (EC-Model)

However, in many cases of abduction the best choice is immediately reached without the help of an experimental trial (which fundamentally characterizes the received view of abduction in terms of the so-called "inference to the best explanation"). Not only, we have to strongly note that the generation process alone can suffice, like it is demonstrated by the case of human *perception*, where the hypothesis generated is immediate and unique. Indeed, perception is considered by Peirce, as an "abductive" fast and uncontrolled (and so automatic) knowledge-production procedure. Perception, in this philosophical perspective, is a vehicle for the instantaneous retrieval of knowledge that was previously structured in our mind through more structured inferential processes. Peirce says: "Abductive inference shades into perceptual judgment without any sharp line of demarcation between them" (Peirce, 1955, p. 304). By perception, knowledge constructions are so instantly reorganized that they become habitual and diffuse and do not need any further testing: "[...] a fully accepted, simple, and interesting inference tends to obliterate all recognition of the uninteresting and complex premises from which it was derived" (Peirce, 1931-1958, 7.37).

My abrupt reference to perception as a case of abduction (in this case I strictly follow Peirce) does not have to surprise the reader. Indeed, at the of center of my eco-cognitive perspective on abductive cognition is the emphasis on the "practical agent", of the individual agent operating "on the ground", that is, in the circumstances of real life. In all its contexts, from the most abstractly logical and mathematical to the most roughly empirical, I always emphasize the cognitive nature of abduction. In this perspective reasoning is something performed by cognitive systems. At a certain level of abstraction and as a first approximation, a cognitive system is a triple (A, T, R), in which A is an *agent*, T is a *cognitive target* of the agent, and R relates to the *cognitive resources* on which the agent can count in the course of trying to meet the target-information, time and computational capacity, to name the three most important. My agents are also *embodied distributed cognitive systems*: cognition is embodied and the interactions between brains, bodies, and external environment are its central aspects. Cognition is occurring taking advantage of a constant exchange of information in a com-

plex distributed system that crosses the boundary between humans, artifacts, and the surrounding environment, where also instinctual and unconscious abilities play an important role.

My perspective adopts the wide Peircean philosophical framework, which approaches "inference" *semiotically* (and not simply "*logically*"): Peirce distinctly says that all inference is a form of sign activity, where the word sign includes "feeling, image, conception, and other representation" (Peirce, 1931-1958, 5.283). It is clear that this semiotic view is considerably compatible with my perspective on cognitive abductive systems as embodied and distributed systems: the GW-Schema is instead only devoted to illustrate, even if in a very efficacious way, a subset of the cognitive systems abductive activities, the ones that are performed taking advantage of explicit propositional contents. Woods seems to share this conclusion: "[. . .] the GW-model helps get us started in thinking about abduction, but it is nowhere close, at any level of abstraction, to running the whole show. It does a good job in modelling the ignorance-preserving character of abduction; but, since it leaves the S_i of the schema's clause (T) unspecified, it makes little contribution to the fill-up problem" (Woods, 2011, p. 244).

The backbone of my approach can be found in the manifesto of my EC-model of abduction in (Magnani, 2009).[1] It might seem awkward to speak of "abduction of a hypothesis in literature," but one of the fascinating aspects of abduction is that not only it can warrant for scientific discovery, but for other kinds of creativity as well. We must not necessarily see abduction as a *problem solving device* that sets off in response to a cognitive irritation/doubt: conversely, it could be supposed that esthetic abductions (referring to creativity in art, literature, music, etc.) arise in response to some kind of esthetic irritation that the author (sometimes a *genius*) perceives in herself or in the public. Furthermore, not only esthetic abductions are free from empirical constraints in order to become the "best" choice: many forms of abductive hypotheses in traditionally-perceived-as-rational domains (such as the setting of initial conditions, or axioms, in physics or mathematics) are relatively free from the need of an empirical assessment. The same could be said of moral judgement: they are eco-cognitive abductions, inferred upon a range of internal and external cues and, as soon as the judgment hypothesis has been abduced, it immediately becomes prescriptive and "true," informing the agent's behavior as such. Assessing that there is a common ground in all of these works of what could be broadly defined as "creativity" does not imply that all of these forms of creativity are the same, contrarily it should spark the need for firm and sensible categorization.

Conclusion

The status of abduction is very controversial. When dealing with abductive reasoning misinterpretations and equivocations are common. What did Peirce mean when he considered abduction both a kind of inference and a kind of instinct or when he considered perception a kind of abduction? Does abduction involve only the generation of hypotheses or their evaluation too? Are the criteria for the best explanation in abductive reasoning epistemic, or pragmatic, or both? Does abduction preserve ignorance or extend truth or both? The paper has tried to answer these questions centering the attention to the the so-called ignorance-preservation character of abduction, such as it is illustrated by the GW-Model (Gabbay-Woods model) of abduction and by the subsequent proposed EC-model.

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[1]Further improvements and extensions of the model are given in (Magnani, 2012, 2013a, 2013b, 2014, 2015).