

# Cognitive Systems Monographs

## Volume 13

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Editors: Rüdiger Dillmann · Yoshihiko Nakamura · Stefan Schaal · David Vernon



Emanuele Bardone

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# Seeking Chances

From Biased Rationality to Distributed  
Cognition

 Springer

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ISBN 978-3-642-19632-4

e-ISBN 978-3-642-19633-1

DOI 10.1007/978-3-642-19633-1

Cognitive Systems Monographs

ISSN 1867-4925

Library of Congress Control Number: 2011923554

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*Typeset & Cover Design:* Scientific Publishing Services Pvt. Ltd., Chennai, India.

Printed in acid-free paper

5 4 3 2 1 0

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*To my brother*



Man is the measure of all things.

Protagoras, Greek philosopher (485 BC - 421 BC)

Man is an external sign.

C.S. Peirce, American philosopher (1839-1914)



# Preface

In the episode “Homer Defined” from *The Simpsons*, Homer saves the Springfield nuclear power plant from meltdown. He saves it by performing a children’s nursery rhyme that allows him to guess which button should be pressed to avert the disaster. Homer immediately becomes a local hero. Indeed, nobody knows how he managed to prevent the local nuclear power plant from meltdown. He even receives an “Employee of the Month” award from his boss. It is only when he saves a second nuclear power plant by using the same rhyme in front of everybody in Shelbyville that his trick is discovered. So, now everybody knows that it was not omniscient intelligence that saved the entire population, but just a blind guess performed by a dumb man like Homer. The episode ends with Lisa reading the phrase “to pull a Homer” – a new idiomatic expression now entered in the dictionary, meaning “to succeed despite idiocy”. This book is about what “to pull a homer” really means to us. More precisely, it addresses the problem of how we as humans succeed despite our *boundedness*.

What the story about Homer tells us is that sometimes we perform well when we think we do not. This is somehow captured by the apparently contradictory statement that sometimes less is more and more is less. As the example of Homer suggests, when we are urged to decide over a certain matter, even a meaningless rhyme like *Eenie, meenie, miney, moe* might be successful or, at least, helpful. Why? Because it makes a problem affordable. Like Homer, we always have a button to press and sometimes we do not know which the right one is. When facing up to unavoidable decisions, anything is always better than nothing.

The example of Homer and his rhyme is quite extreme, but it points to one of the most distinguishing abilities that human beings display, that is the ability of turning almost everything – even a string of meaningless words – into a clue to make a problem affordable in relation to what one knows and, most of all, to what one *does not* know. That is what characterizes humans as *chance seekers*.

Many centuries ago the Chinese military general and strategist Sun Tzu wrote in his *The Art of War* that when we do not have any idea how to make the required decision, then “everything looks like important information” and “it becomes impossible to sort the useless from the useful”. This does not mean that we are completely lost and in the dark. Quite the contrary, it means that in the absence of *premissory starting points*,<sup>1</sup> ignorance may turn out to be a chance to be cognitively virtuous. Ignorance should not be considered simply as absence of knowledge as it might be used as a clue for making a decision affordable to us. Consider this very simple example. I am at the airport and I do not know which terminal my flight will take off from. I could ask a flight assistant to help or I can simply go to one of the terminals and check the timetable to see if my flight appears one of the monitors. If not, it means that I am at the wrong terminal. In this case, it is by means of what remains unknown – my ignorance – that I can make a guess.

There are several other ways in which we can make the best of our ignorance. For instance, there are some things that we think we know simply because we are *told* that they are so. But actually we do not know that they are so. For example, when taking advice, we simply trust the person who is giving it to us, whether we are buying a new laptop or selling our stocks and shares. Sometimes, we think we know something that we do not, simply because we are told that it is so by a person who we trust. While on other occasions we may even watch what other people do and follow the crowd.

It is worth noting here that in all the cases I have mentioned – from homer’s rhyme to taking advice, or not – our ignorance remains *preserved* somehow. For instance, if a friend of mine says that the new laptop by Apple or Dell is worth buying because it has certain features, I could follow his advice, and yet not know anything about either laptop. The same can be said about the example of the flight. I still do not know my flight terminal, I just know that, if that were the case, I would know it.

What all these examples share is that they can be easily dismissed or debunked. That is, it is easy – from an intellectual perspective – to point to their weakness. In fact, they are all traditionally considered as fallacies. My ignorance about my flight terminal and the fact that I trust my friend are scarcely relevant. In sum, they are easy to deploy but also easy to dismiss. This is basically the rationale of what I call *fallacious* or *biased rationality*. They are rational insofar as they do not necessarily lead us to a bad outcome, moreover, they are not dependent on a particular context but, at the same time, they appear to be quite unreliable.

The main problem of fallacious or biased rationality is that it contrasts with a human attitude according to which some people are not satisfied with weak arguments or *it is just so* strategies. They want something better, for instance, some chances that are well-grounded, more reliable, or at least less

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<sup>1</sup> I derive this expression from Woods (2009).

weak than others. On some occasions, human beings are able to deploy arguments or strategies that preserve ignorance, yet *mitigate* it.

Ignorance might be a clue, but, as Socrates contended more than two thousand years ago, it can also be a stimulus to *learn* things as we are motivated to formulate arguments and use strategies that are potentially harder to dismiss. My thought is that, when resorting to this kind of “Socratic” ignorance we need to distinguish between what it is *relevant* or *symptomatic* to our decision and what it is not.

This second attitude points to a different form of rationality that takes advantage of the idea of *distributed cognition*. Basically, humans improve their survival strategies by building eco-cognitive structures capable of delivering potentially ever more symptomatic information. It is through various manipulations of the environment that we gain new and more reliable chances which can be used to *de-bias* our rationality. Indeed, a children’s nursery rhyme or a trustworthy friend allow us to make decisions affordable, even when they would not otherwise be so. At the same time however, through the laborious activity of cognitive niche construction, we come up with situations in which we are *better afforded* by our environment, and thus biases or fallacies cease to be appealing. In this sense, our environment is a source of selection pressures over human life, but also a storehouse of cognitive chances, namely, affordances, which are potentially more relevant to our survival and prosperity.

Manipulation of the environment – a hypothetical activity – unearths affordances that, once stored in our various cognitive niches, can be accumulated and contribute to de-biasing our rationality. Indeed, this is not a permanent result. There is no method of securing successful affordances to our genome. Our cognitive niches – and all the extensions of our rationality – may be enriched, but they can also perish or collapse. In this sense, our rationality is still bounded. That is, the activity of distributing our cognition does not lead to a complete de-bounding of human cognitive system. However, it contributes to move the bounds of cognition.

## The Structure of the Book

One of the facts that I take for granted in this book is that human cognition is bounded. Human cognition is bounded when it falls short of omniscience. In my view, this simple statement warns us to adopt a cognitive agenda, which does not seriously take into account what people actually do, before considering what they *should* do. And what do people often do? They make mistakes, lots of mistakes. Mistakes are basically symptoms of what it is going on within our cognitive system. In the first chapter *Fallacies and Cognition: The Rationale of Being Fallacious* I will develop this idea presenting the case of fallacious reasoning as an example of the importance of accounting for

mistakes. The frequency and ubiquitousness of fallacies – traditionally considered as patterns of poor reasoning – is symptomatic of the fact that human cognition has a strong commitment to *cognitive economy*. When operating in cognitive economy, what appears to be clearly erroneous may turn out not to be so. Fallacious rationality has its appeal and investigating what it precisely consists of is an imperative task. The main thesis I will develop is that the importance of fallacies is *symptomatic* in the sense that they are symptoms of the way cognition works.

In the second chapter *Bounded Rationality as Biased Rationality: Virtues, Vices, and Assumptions* I will look carefully into the kind of boundedness we are limited by. In doing so, I will integrate the issue of fallacious reasoning into a wider debate concerning biased rationality. In that chapter I will show the vices and virtues of biased rationality. I will discuss when biases and fallacies are good, but also when they uncover unreliable or at least “maladaptive” solutions to our survival and prosperity. Some questions will then be explored in more detail. What does being cognitively bounded really mean? As Woods arguably noted, “we survive, we prosper, and from time to time we build great civilizations”. How could that be possible given our limitations? How could we possibly account for the amazingly successful outcomes humans sometimes bring about?

Our commitment to cognitive economy does not imply that the cognitive assets humans have cannot be improved and extended beyond previous limitations. This is basically the idea that while we cannot get rid of our boundedness it is not to say that we cannot reach something better. For the problem is not that of the bounds (that we do have) but that of *their instability*. Bounds are not fixed once and for all but are in constant movement. For example, they move (a) in relation to representations of the problem and of alternatives, (b) in respect to resources they use (paper, pencil, computer, figures, tables, books, reports, etc.), (c) because of the creative activity of our brain (here heuristics operate, for example), (d) as emotional states intervene, (e) together with moral values, and so on. To view the bounds of human cognition as moving is made possible by the assumption that our cognitive system is distributed. This will be discussed in the third chapter *Moving the Bounds. Distributing Cognition through Cognitive Niche Construction*. The main thesis that will be illustrated here is that human beings do not actually hold a complete representation of their environment. Conversely, they use the environment itself as a representation by manipulating and even creating it so as to find room for new *cognitive chances* which were not immediately available. This idea of human cognition as a chance-seeking system will be developed within an evolutionary framework based on the notion of cognitive niche construction. According to this theory, the high level of plasticity exhibited by humans is explained by the fact that humans

are powerful *eco-cognitive engineers*. The accumulation and, most of all, the persistence of modifications on the environment is what grants humans an additional source of information, not delivered through genetic material, that is in fact fundamental for behavior control.

It appears to be a circular argument to claim humans turn environmental constraints into ecological chances when facing the challenges posed by the environment itself. That is not the case, as we assume that organisms (including humans) adapt to their environment, *and vice-versa*. This will be illustrated in the fourth chapter *Building Cognitive Niches: The Role of Affordances*. What I will argue is that human cognitive behavior consists in *acting upon* those anchors to which we have secured a cognitive function, via cognitive niche construction. Those anchors are basically *affordances*. Affordances are a way of measuring or representing the environment with respect to the action capabilities of an individual. Here, again, humans do not hold a complete internal representation of the environment but they use the environment itself as a model insofar as they can immediately access it in terms of those action capabilities, which emerge in the interplay between humans and their environment. The notion of abduction will contribute to making our point bolder. Going beyond a sentential and computational dimension of abduction towards including it in a broader semiotic one, I will argue that affordances can be related to the variable (degree of) *abductivity* of a configuration of signs. This will be of help when illustrating the evolutionary dimension of affordance detection and creation. I will argue that humans have at their disposal a *standard* or *pre-wired* endowment of affordances, but at the same time they can extend and modify the range of what can offer them affordance through the development of appropriate cognitive abductive skills.

As already argued, what is crucial for making plasticity work is to turn environmental constraints into *ecological chances*. This transformative activity is at the core of our proposal, which is to view human cognition as a chance-seeking system. We build and manipulate cognitive niches so as to unearth additional resources for behavior control. This activity of eco-cognitive engineering is basically what best describes our idea of *learning* as an *ecological task*. In the fifth chapter *The Notion of Docility: The Social Dimension of Distributing Cognition* I will present the notion of docility. First introduced by Herbert Simon, I develop the original notion arguing that docility is that kind of disposition underlying those activities of ecological learning. As most of the resources we benefit from are stored externally, docility is supposed to facilitate the delegation and exploitation of cognitive chances secured to cognitive niches. From an evolutionary perspective, docility is an adaptive response to the increasing cognitive demand on those information-gaining ontogenetic processes like learning, resulting from an intensive activity of cognitive niche construction. In this sense, docility makes people more inclined to overcome their ignorance by means of learning. It facilitates information sharing and accumulation.

The last chapter *Seeking Chances. The Moral Side* is a sort of appendix. It is an attempt to integrate morality into the distributed framework presented in the previous chapters. This is not an attempt to articulate a complete moral theory on the basis of our proposal. Rather, it is meant to offer its practical application to moral reasoning. What I will discuss is that the mechanism underlying chance-seeking activities may capture some important features of moral reasoning. Basically, I will present the thesis, first introduced by Lorenzo Magnani, according to which morality is a distributed phenomenon. Morality is distributed in the sense that even our moral agency is continuously shaped and reshaped by the activity of niche construction. Various technological artifacts, but also institutions and language itself, extend our capacity to discern moral values and cope with situations which would require a moral commitment. I am far from developing a unified approach which would combine cognition and morality, but we believe that this would be a valuable starting point.

I started to think about the research covered in this book while studying as a PhD student in Philosophy at the University of Pavia, Italy. Preparation of this work would not have been possible without the resources and facilities of the Computational Philosophy Laboratory (Department of Philosophy, University of Pavia, Italy). This project was conceived as a whole, but as it developed various parts became articles, which have now been revised and integrated into the current text. I am grateful to Springer for permission to include portions of previously published articles. Parts of Chapter 1 were previously included in: E. Bardone and L. Magnani, “The Appeal of Gossiping Fallacies and its Eco-logical Roots” in *Pragmatics and Cognition*, 18(2), 2010.

For valuable comments and discussion of a previous draft I am particularly grateful, first of all, to Lorenzo Magnani (University of Pavia, Italy) who has been an ideal supervisor over the years I have spent as one of his PhD students. He is a great mind, a great human being: it will be very hard to repay his kindness. A very special thanks goes out to Ester Võsu (University of Tartu, Estonia) who has really extended my cognition during the last stages of preparation of this volume. My work has benefited from discussions with several people over the last four years. Chiefly, Davide Secchi (University of Wisconsin, La Crosse, US), Tommaso Bertolotti (University of Pavia, Italy), and Bernardo Pino Rojas (University of Santiago, Chile) who all deserve a special mention for having challenged my thoughts and ideas, which otherwise might have become a graveyard of circular arguments. My thanks and appreciation goes also to all those students who have taken my course in Cognitive Philosophy at the University of Pavia and road-tested the ideas in this book. I would thank Claudio Pizzi (University of Siena, Italy) and Liliana Albertazzi (University of Trento, Italy) for providing me with valuable comments and remarks on a previous draft of the book. Finally, a special thanks to and Kai Pata (Tallin University, Estonia), Roberto Feltrero (UNED, Madrid, Spain), Merja Bauters (University of Helsinki, Finland), Kristian Bankov (University of Sofia, Bulgaria).

Some sections have been written in collaboration with Lorenzo Magnani and Davide Secchi: sections 1.1, 1.2, 3.1, 3.3, 4.1, 4.2, 4.3 with Lorenzo Magnani, sections 2.1 and 2.2 with Davide Secchi.

In conclusion, I recognize that this research would not have been possible without the financial assistance of the Italian Ministry of Education and the project “Dottori di ricerca e mondo del lavoro” (2009), University of Pavia, Italy.

November 2010

Pavia



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