A Re-examination of Epistemological Paradigms Describing Animal Behavior in 8 Points

"Animal Consciousness and Science Matter": a Reply

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1. Introduction

This is my contribution to the debate on the ability of nonhuman species to think and possess various levels of intentionality, in line with Bekoff's view that exploration of this subject can only deepen our understanding of the ontic of the many species whose behavior is the expression of their nature. My reflections, articulated in 8 points, aim to open up the debate by examining the following scientific points:

1. The use of the *macchinomorpho* model to describe animal behavior.
2. The use of psycho-energetic and behavioral paradigms to interpret animal behavior.
3. The insubstantiality of the reificatory principle: nonhuman animals as inert objects.
4. Evolutionary subjectivity.
5. Defining intelligences.
6. Animals: proprietors of their own cognitive resources.
7. Deconstructing consciousness as *intent* and restoring its adaptive dimension.
8. Disentangling biocentrism from anthropomorphism.

Likewise, I am convinced that all epistemological ambiguities and misunderstandings must be dealt with in order to develop an elucidatory cognitive model of nonhuman existence.

Primarily, I consider it reductive to deem all nonhuman cognitive activity merely as a collection of higher functions that manifest only at the moment

in which the animal needs to express flexibility, understanding, creativity or intention. Such a mentalistic approach requires the overriding of traditional paradigms based on automatism, such as the Impulse and Strategic-Rationale models. Clearly, the mind, if present, is expressed in every act by the individual. Cognitive models elaborated on the concept of elaborative schema are much more parsimonious than behaviorist or psycho-energetic models, as demonstrated in human psychology. Frankly, maintaining an explicative dichotomy between humans and nonhumans is not scientific.

In addressing the various issues above, I present the following eight strictly theoretical points, the result of my work over the last twenty years applied to various typologies of animals, published in *Intelligenze plurime. Manuale di scienze cognitive animali* (Marchesini 2008) and *Modelli cognitivi e comportamento animale* (Marchesini 2011). These points can contribute to creating, I believe, a blueprint in the development of discussions and researches founded on a new paradigm, which avoids all forms of epistemological anthropocentrism.

2. Point 1. The 'mechano-morphic' model

As a first point I wish to emphasise that the choice of the *macchinomorpho* model to describe and explain nonhuman animal behavior does not comply with any logic of scientific rigor, as we would be encouraged to think, but rather to a philosophical preconception, i.e.: the urge to create a distinction between human beings and other animals. The *animal machine* model cannot be presented as a scientific hypothesis if it does not define what type of machine it is making reference to, because, being itself an abstraction, it cannot be shown to be false, and therefore is reduced to being a hypostatic and tautological structure.

We can only put references to a specific *machinistic* model to the test, but every time a clarification is attempted, a curtain of approximation is drawn across, making it impossible to shine a light on the falsificatory praxis on which this 'scientific method' claims to be based. Furthermore, the Darwinian paradigm suggests that comparisons based on homology and analogies are the basis for taxonomic attribution and an ontological understanding of the species. It is not solely attributable to an anthropomorphic position, for example, to point out that when considering the femur of a horse, it is more correct to use a human femur as a frame of reference for comparison, and not a lamppost. For the very reason that nonhuman animals are not mechanical constructions, the *mechanomorphic* explanation should be rejected.

3. Point 2. Paradigms adopted to describe animal behavior

Secondly, it is paradoxical that interpretations of animal behavior adopt two paradigms, which have been largely falsified by observatory-experimental praxis, that is to say the psycho-energetic approach of classic ethnology, and the associative approach of behaviorism.

Psycho-energetics attempts to explain innate nature via three phases of impulse, starting from an energetic-appetite phase, via behavioral expression to a resting or resolution phase during which it is difficult to elicit the animal's response. The use psycho-energetics makes of negative biofeedback in explaining behavioral expression (for example physiological needs such as urination or eating), has been debunked both in and by behavioral and neurobiological research.

To use the example of a dog which attacks: contrary to what psycho-energetics says, in the instant immediately following the attack, there is a greater rather than lesser likelihood that the dog will repeat the behavior. To use the metaphor of a pressure-cooker, we are not talking about pressure which can be lowered via a valve system, but about a neurobiological pattern, which once set-off increases the likelihood of repeat behaviors.

In the same way, the law-of-effects, which from Thorndike carries over to behaviorism, maintains that (a) an increase in a particular behavior indicates reinforcement; and (b) after punishment, a given behavior will be statistically less probable.

Nowadays we understand the sway exerted on the development and evolution of behaviors by such forces as evocation, practice, mimesis and assimilation. But it is striking to what extent there is a failure to appreciate how much of an error the use of punishment is: most unbalanced behaviors such as anxiety, phobias, compulsion, stereotypes, irritability, clinginess, etc., increase following punishment, as is true for all behaviors with an emotional or motivational base.

To continue using the synthesis between psycho-energetics (what is innate) and behaviorism (what is learned) is not scientific, but purely ideological. It does not need pointing out, then, that describing a single phenomenon (animal behavior) using *three* epistemological paradigms (psycho-energetics, associationism, and cognitivism) is not in line with Ockham's razor.

4. Point 3. Debunking the reification of nonhuman animals

As a third point I feel it is urgent to underline how baseless the reificatory process is, which eradicates the distinction between *natura naturans* and *natura naturata*, and describes nonhuman animals as though they were an inert, passive material, compellingly regulated and confined by the laws of nature. The reality is that animals are active entities, able to construct their own ontical dimension and to act out modifications in the world. I will attempt to explain this taking into consideration ontogenetic and phylogenetic dimensions.

When we speak of ontogeny – the development of the whole entity – we consider the innate dimension as: (a) functional determinant filtered through phylogenies, according to which a given attribute selected for a given function would be limited to that same function in the subject; and, (b) evolutionary determinant, for which, each *a priori* attribute would have a predetermined developmental destiny.

These two statements are misleading, but they offer themselves to reificatory projections. Starting from statement (a), both Ernst Mayr (1997), when talking of remote and proximal causal duality, and Nikolaas Tinbergen (1951), in posing his four questions, exhorted us not to conflate *evolutionary compatibility*, dictated by the fitness of the subject, and *elicitative compatibility* governed by hedonic-elicitative principles that the individual is subject to.

So if it can be proven that the fitness of altruistic behavior responds to the parameters of Hamilton's coefficient of relatedness, then it is equally true that an individual possessing a given trait may express it toward any entity which is capable of eliciting it, for example the expression of maternal instinct by an adult female of one species toward a cub of a different species. The explanation that refers to fitness tells us only whether an attribute is compatible in individuals of a given species, not why an individual would express it.

With regard to statement (b) it should be noted that the development of a behavioral profile adopts innate coordinates but in co-optative mode (ontogenetic exaptation), freely and unpredictably giving rise to individual behavioral identities characterized above all by creativity, and more generally by the exercising of subjectivity by the individual. Thus, the behavioral structures of the individual animal are not the strings of a puppet, but more precisely attributes available subjectively to the animal.

5. Point 4. Evolutionary subjectivity

With this fourth point, I wish to emphasize evolutionary subjectivity, which has been mortified by a version of Darwinism that converts the evolutionary process of living beings into a sort of isochronal algorithm, and nullifies any historical or participatory reference to the subject in phylogenies. For this reason I wish to return the individual living being to the center of the evolutionary process, and make a detour from Lamarckian constraints regarding acquired characteristics, by conversely highlighting the ways which an individual, through behavioral ingenuity and inspired free choice, is able to modify the urges of natural selection, and accordingly, the destinies of the various characters present within any given population.

This hypothesis is directly aligned with current dialectic interpretations of homeobox phenotypical directives and of the evolutionistic vision, which, from the evolutionary tinkering of François Jacob (1970), to the *exaptation* of Stephen Gould (2002) and Elizabeth Vrba (Vrba and Eldredge 2005), portrays animal populations as active participants in the relationship with their environment. If we can agree with Darwin's ideas on natural selection, it is not acceptable to postulate, in the light of discoveries by modern genetics, that living beings are no more than vessels with replicatory function. The discoveries that organisms make modify selective pressures, which themselves are responsible for the attribution of fitness of a given characteristic.

Darwin believed that human technology simply diminished the pressure of natural selection, although, in reality, every behavioral device modifies selective predicates: for example the advent of a certain technique or technology selects those individuals who are able to make use of it.

6. Point 5. Defining intelligences

I dedicate point 5 to dissecting the definition of 'intelligence' into two distinct senses: one of comprehension and resolve (*intus-legere*); and one of choice and decision (*inter-legere*), which are usually conflated as a single concept. I wish to do this simply in order to evaluate the merit of classificatory mechanisms used to distinguish between various species and which assume that the substantive measuring stick for this is, by definition, human-ness. The result of such classification can only be a given: humans are at the vortex of intellect, therefore animals, which most resemble humans (chimpanzees, pygmy chimps and gorillas) are considered those most intellectually endowed.

This brings me back to Darwin. Darwin, amongst other things, was the father of continuism, which in its time dealt the deathblow to platonic essentialism. His primary contribution, however, was as theorist of *speci-alisation* (conceptualising the different-abled-ness of certain species), which overtook the Aristotelian *scala naturae*.

Just as there is no sense asking ourselves which animal is more capable of perceiving, more equipped with endocrine glands, better at digesting via a gastro enteric tube, more equipped for movement, etc., there is no sense either measuring a single function, in this case intellect, with the measure of + plus vs. – minus, because every species has evolved its own specific aptitudes, according to its particular adaptive needs, in being able to comprehend, problem-solve, make choices and decisions.

Hence, we appreciate that tree-dwelling animals are masters of the detour; underground rodents are virtuosos of labyrinth-mapping; food-storing birds have extraordinary topognostic memories, just as dogs have a matchless social intelligence. In brief, there is no ultimate proof of intelligence, and above all, there is no basis for man being the unit of measure because every species, humans included, has developed intelligences dedicated to specific cognitive challenges. I am referring to cognitive plurality and retain that it is fundamental to start with adaptive checkmate in profiling the intelligences of every single species, by applying the same research methodologies to intellect as are applied to other functions, and by eschewing the adoption of scales of arbitrary value within which different species vie with each other for 'superiority'.

7. Point 6. Animals: proprietors of their own cognitive resources

The sixth point should be reserved for qualifying the subjectivity of animals as 'owners of their own cognitive resources' and of their sense of the 'here and now' with regard to the passage of time. I am mindful that this is a significant forward slide epistemologically, which while not aiming to deny the importance of conscience in all of its diverse levels of intent, underlines that subjectivity is something that oversteps the limits of consciousness.

We are accustomed, for cultural and religious reasons, to regard consciousness as the foundation of subjectivity, when, in fact, this is just one manifestation of subjectivity, and not necessarily the one most qualified to carry out the functions of elaboration and of positioning the subject in the world.

An animal has an identity, not because it possesses consciousness – and we cannot doubt consciousness exists and is indispensable in carrying out certain intellectual functions, which demonstrates that it is part of the legacy of nonhuman animals – but also because the animal is not driven by its cognitive resources, rather it makes use of them, freely and creatively. The animal is governor of its own consciousness.

Inborn cognitive resources evolved during ontogenesis symbolize (a) an entanglement of instances, often in conflict, unable to regulate the individual but providing a blueprint which gives rise to arbitrary selections and unpredictable outcomes; (b) a mould or pattern, like a map, from whose structure it is not implicit what any functional outcome should be, any more than a map is responsible for an itinerary; (c) utilities or services which take on a different valence according to the particular point of time in the life of the subject and whether or not it has the ability to project into the future. If it is important to speak of consciousness in nonhumans, it is just as urgent to re-examine the bases of explicative models of behavioral expression, abandoning psycho-hydraulics and conditioning operands because it is within base behavior that we witness subjectivity in animals.

8. Point 7. Consciousness: intent vs. adaptive dimension

Point seven deals with the conundrum of consciousness, by deconstructing a reading of this as *intent* and restoring it to an adaptive dimension. Consciousness is a referential function (to be conscious of) and as such ought not to be given a value outside the intellectual context of the species, as though it was a function in itself, as the real function of consciousness is to focalize the operative and positional challenges facing the subject. It is therefore not possible to use the human species as a unit of measure, but merely as a term of comparison with two variables, in particular: functional universals such as eating, reproducing, resting, etc. and adaptive specifics, meaning the specific existential style of a particular species.

Every animal is required to perform functional universals, but each species does this in a particular manner. In this sense I mean to say that a cat has a much greater awareness of its own body than I do of my own, or than most other humans have of their own bodies; that a gazelle has a far greater responsiveness to certain emotions such as fear/anxiety than any human; and that the way in which a lemur has an awareness of three-dimensional space far beyond that of humans.

Awareness is a sort of zoom function, capable of dragging a fragment of here and now (which by its very nature is constantly mutating) into sharp

focus, from an elaborative and positional perspective. But in order to do this, 'awareness/consciousness' must be able to rely upon a certain stability within the nature of the subject, for which there cannot be an ephemeral awareness, if on the other hand there is not an enduring awareness of self. I maintain therefore that every negation of self-awareness/consciousness is an epistemological error before it is a scientific or ethological mistake. Gordon Gallup's mirror test was important and a fundamental passage, however we must be clear that recognizing one's reflection is not a benchmark by which we can deny that other species possess self-awareness.

9. Point 8. Disentangling biocentrism from anthropomorphism

As eighth point, I return to the term 'biocentrism', proposed by Bekoff, disentangling the concept from anthropomorphism, the last remaining vestige of anthropocentrism. There is no doubt that humans share many cognitive aspects with other species, and this very fact ought to spur us to deepen our understanding of ourselves as a species, in order to divest ourselves of the outworn certainties of anthropocentrism and adopt a transversal, biocentric investigatory focus.

Familiar as I am with the writings of Bekoff, I uphold that his view of anthropomorphism is a first step towards bringing humans down from the disjunctive pedestal that still dominates the ethological and philosophical landscape. I note how much more correct it is to attribute to other species characteristics similar to our own, rather than describe them using a Cartesian model, as though they were clockwork mechanisms, because every negationism should be given the chance to be put through its paces.

Having said that, to suggest as Marian Dawkins does that every hypothesis regarding animal thought is arbitrary, following the aphorism "What is it like to be a bat?" (Nagel 1974), does not respond to true agnosticism, but only to its forerunner, negationism, neither in line with scientific dictates, nor with its closest epistemological registers. If it is true that Science runs counter to intuition (Wolpert 1992), and turns away from epistemic anthropocentric dominions (Bachelard [1932] 2002), it is evident that the death blow to our former imagining of the world has been dealt pre-eminently by amendments brought about by Science.

Science is not agnosticism, but a continuous formulation of hypotheses and counterfeit praxes charged with constructing an imaginary of reality that goes beyond what the legacy of phylogenies would have us see. Anthropo-de-centrifying towards biocentrism, starting from functional

universals and from the distinct styles of species-specific adaptation, means starting from a particular challenge to a particular species in order understand cognitive function. This is the best way to hone in – as is the duty of every ethologist – on what it means to be a bat.

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