



The evolution of consciousness

Asier Arias Domínguez

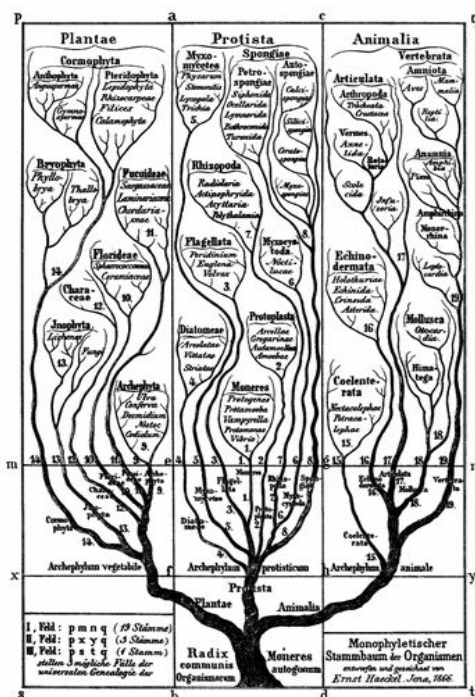
Dept. de Lógica y Filosofía Teórica, Universidad Complutense de Madrid, España

Tipo de artículo: Actualidad, Multilingüe.

Disciplinas: Neurociencia, Psicología, Filosofía.

Etiquetas: consciencia, cerebro, emoción, evolución, interocepción.

The study of the evolution of consciousness is gaining momentum among researchers in different fields. Until now, the debate has been largely shaped by theories that concentrate on exteroceptive and cognitive systems, and neuroaffective theories have been notably overlooked. Antonio Damasio's neuroaffective theory of consciousness proposes that the primordial mental experiences arise from homeostatic feelings, generated by the functioning of the interoceptive system in its unique bidirectional interplay with the body. Recent papers by Damasio and colleagues further support this rationale and open up new avenues for the comparative debate on the evolution of consciousness.



(dp) Ernst Haeckel.

Virtually all participants in the debate on the evolution of consciousness agree that consciousness should be described as subjective, felt experience. However, beyond this common ground, our perspective on the core features of subjective experience and our favored neurobiological theory of consciousness will inevitably influence our understanding of the evolution of consciousness. The predominant theories of consciousness rely on data obtained from experimental paradigms in the psychology of perception and attention, with the underlying assumption that consciousness depends on processes that begin in exteroceptive pathways and culminate in complex cognitive functions such as attention or working memory.

Most of the debate on the evolution of consciousness has taken place within this exteroceptive-cognitive framework, and quite often the evolution of consciousness is equated with the evolution of specific perceptive and cognitive capacities. In the most extreme cases, consciousness is defined as a type of cognition so intricate that it has no evolutionary precedent outside of Homo sapiens.



Joseph LeDoux has prominently advocated for this cognitivist view. In *The Deep History of Ourselves*, he takes us on a journey through the history that connects the evolution of behavior to the evolution of consciousness, but the connection is finally scarce. In the preface LeDoux speaks of our «unique capacities [for] thinking and feeling» (LeDoux, 2019: 18), in the last chapter he confirms how unique these capacities are: conscious feelings are «human specializations made possible by unique capacities of our brains» (ibid: 368), such as language and hierarchical relational reasoning.

According to LeDoux, even if consciousness exists in non-human animals, their inability to communicate linguistically poses insurmountable challenges for its scientific study. Indeed, he defends an updated version of Morgan's Canon, cautioning against conflating similar behaviors with similar experiences and encouraging researchers to focus less on consciousness itself and more on clearly shared and directly measurable cognitive and behavioral capacities.

Certainly, we cannot speak with the stars, nor directly measure their composition or temperature. In his 1835 *Cours de Philosophie Positive*, Auguste Comte predicted that their chemical composition and temperature would forever remain beyond our grasp. A century later, Cecilia Payne's answers to both questions were already part of accepted hard science. That's what science consists of: not opening mysterious boxes and directly looking inside, but formulating hypotheses, designing experiments, gathering data, and making sense of it all in the context of other well-established theories.

While LeDoux covers the evolutionary history from the first multicellular organisms to humans in a few pages, psychiatrist Todd Feinberg and biologist Jon Mallatt's neuroevolutionary approach in their 2016 *The Ancient Origins of Consciousness* draws upon a wealth of data from fossil evidence, comparative neuroanatomy, and cognitive ethology. However, even though they devote two entire chapters to the affective and interoceptive aspects of consciousness, their evolutionary history of consciousness ultimately focuses on the evolution of vertebrate sensory systems. Neurobiologist Simona Ginsburg and biologist Eva Jablonka's 2019 *The Evolution of the Sensitive Soul* outlines a more comprehensive evolutionary history of consciousness, including vertebrates and numerous invertebrates under a general marker of experience: a sophisticated type of associative learning that allows for a wide range of abilities to discern, anticipate, and connect stimuli and actions. The focus remains, nonetheless, on exteroception.

In chapter 8 of his 2020 *Metazoa*, philosopher Peter Godfrey-Smith elaborates on an idea hinted at in previous work (Godfrey-Smith, 2020): there may exist a phylogenetic split between conscious animals, with most of them combining sensory and evaluative-affective experience and few having experiential profiles dominated by just one of these dimensions. Godfrey-Smith suggests that some arthropods might fall into the sensory-only category, although a compelling case can be made that the available evidence does not support this interpretation (Veit, 2022). Setting aside this questionable exception, there seems to be little room for any kind of conscious experience without its evaluative-affective dimension, and if this is the case, then a crucial benchmark for the suitability of any neurobiological theory of consciousness would be its capacity to account for this pervasive evaluative-affective trait of felt experience.

Antonio Damasio has developed the most detailed theory of consciousness integrating this evaluative-affective dimension. Damasio elaborates his theory drawing a connection between consciousness and the homeostatic design that underlies all biological phenomena. This connection is intended to show how the conscious mind gradually reveals the basic mechanisms of life regulation that preceded its emergence.

Expanding on his 2010 *Self Comes to Mind*, he argues that feelings are the primordial mental experiences (Damasio, 2021). Damasio sees feelings as akin to other forms of perception, but there is a crucial difference: the objects and events that generate feelings are internal to the body, not external. Here we depart from the exteroceptive domain in which the discussion has thus far unfolded: in order to understand the origin and evolution of consciousness we must turn our gaze inward, to the ancient inner world of humors and viscera, the world of interoception. According to Damasio's proposal, the perception of the internal state of the organism as it goes through homeostatic regulation is the basis of conscious experience. This interoceptive

framework opens new avenues for the experimental study of the biology of consciousness, but also for the comparative debate on the evolution of subjective experience.

In three recent papers, Damasio and colleagues deepen in the rationale for the dependence of feelings on the functioning of the interoceptive system, stressing the importance of its physiological features and the distinctive non-mediated character of the interoceptive bidirectional interaction between the body and the nervous system (Carvalho & Damasio, 2021; Damasio & Damasio, 2022; 2023). These physiological features include signaling by extracellular diffusion, lack of myelin insulation and permeable barriers between blood stream and nervous cells. Each of these features was evolutionarily «upgraded» (by synapses, myelin and blood-brain barrier), and yet preserved in the interoceptive system. This suggests that the direct crossinfluence between neural and non-neural worlds these features allow plays some biologically decisive role, and the similarity between the nature of interoceptive physiological processes (diffuse and continuous) and the phenomenology of homeostatic feelings (vague and seamless) points out to its crucial contribution in the emergence of felt experience.

Damasio has developed a rich evolutionary framework for the neurobiology of consciousness. However, additional experimental and theoretical research is required to further elaborate the interoceptive theory and effectively incorporate it into the ongoing debate on the phylogeny of consciousness. There are new avenues for the evolution of consciousness to be explored.

References

- Carvalho, G. & Damasio, A. (2021). Interoception and the origin of feelings: A new synthesis. *BioEssays*, 43, e2000261.
- Comte, A. (1835/1975). *Cours de Philosophie Positive*. París: Hermann.
- Damasio, A. (2010). *Self comes to mind*. New York: Pantheon.
- Damasio, A. (2021). *Feeling & Knowing*. New York: Pantheon.
- Damasio, A. & Damasio, H. (2022). Homeostasis and the biology of consciousness. *Brain*, 145, 2231-2235.
- Damasio, A. & Damasio, H. (2023). Feelings are the source of consciousness. *Neural Computation*, 35, 277-286.
- Feinberg, T., & Mallatt, J. (2016). *The Ancient Origins of Consciousness*. MIT Press.
- Ginsburg, S., & Jablonka, E. (2019). *The Evolution of the Sensitive Soul*. MIT Press.
- Godfrey-Smith, P. (2020). *Metazoa*. Nueva York: Farrar, Straus and Giroux.
- Godfrey-Smith, P. (2020). Varieties of subjectivity. *Philosophy of Science*, 87, 1150-1159.
- LeDoux, J. (2019). *The Deep History of Ourselves*. New York: Viking.
- Veit, W. (2022). Towards a comparative study of animal consciousness. *Biological Theory*, 17, 292-303.

Manuscript received on March 16th, 2023.

Accepted on June 23rd, 2023.

This is the English version of
Arias Domínguez, A. (2023). La evolución de la consciencia. *Ciencia Cognitiva*, 17:2, 38-41.

